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# GAS JOURNAL

LIGHT ✦ HEAT ✦ POWER ✦ BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

VOL. CLXVI. No. 3183.] LONDON, MAY 14, 1924. [76TH YEAR. PRICE 1s.



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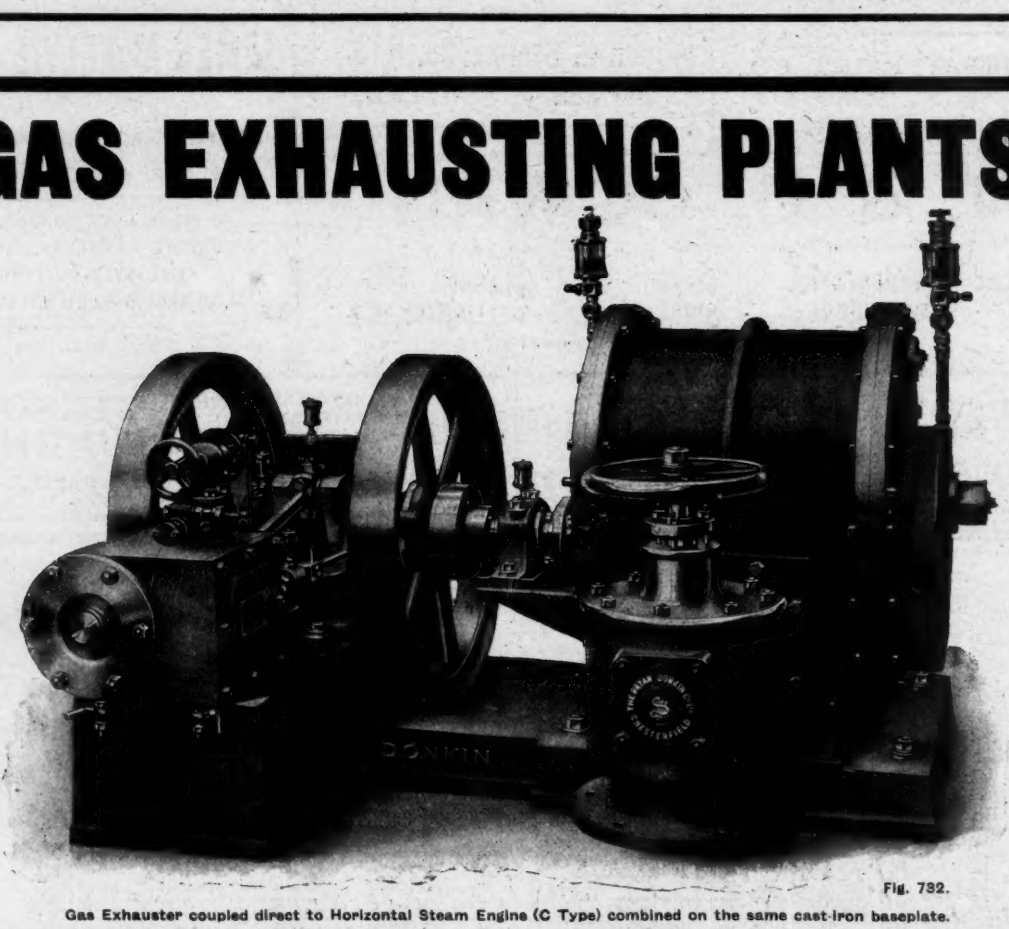


Fig. 732.

Gas Exhauster coupled direct to Horizontal Steam Engine (C Type) combined on the same cast-iron baseplate.

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VOL. CLXVI., No. 3183.] WEDNESDAY, MAY 14, 1924. [76TH YEAR.


## EDITORIAL NOTES.

### The Gas Exhibit and Independent Testimony.

SPONTANEOUS, independent testimony is valuable and encouraging. Such testimony can be given by word, or it can be conveyed by a rapt interest. There has been a gratifying accumulation of this at the Gas Exhibit of the British Empire Exhibition from the visit to it on May 2 of Their Majesties the King and Queen, with the Duke and Duchess of York. By that day, herculean effort (as we reported last week) had dealt with every detail of the internal equipment and garnishing that mattered. There was the reward. The interest of the Royal Party in everything that was to be seen there and the thanks that were personally conveyed, were eloquent of a brilliant success. To our mind, the best judgment as to the success of a co-operative display such as this, is not necessarily supplied by those engaged in the industry promoting it, but by those outside the industry. The achievement of the intended purposes among those the industry serves or wishes to serve, is the true test; and from the King and Queen to the poorest of their subjects who have visited the Gas Exhibit, there has come the welcome testimony of an interest which makes them linger, examine, and learn. Nothing could be better. There is also the testimony of expressed appreciation and congratulation over the accomplished work. When this issues from persons wholly disinterested, there is gratification; when it comes from our business competitors, there is lively satisfaction. Such testimony has come from electrical engineers with spacious minds; and there are some so endowed. Many have visited the Gas Exhibit. It is natural they should do so—just as it is natural that gas men should go and witness for themselves the best that the electrical industry has to show. When trading competitors visit each other's display, they do so as a rule in a critical spirit. More than one electrical man has entered the Gas Exhibit halls in a critical mood, and has left filled with admiration. In one instance, the remark was made: "This is the most effective and impressive gas display I have ever seen;" and there was a genuine ring in it. This being the view of a critical visitor, whose outlook is that of a competitor, we may be pardoned for slapping the backs of the Executive Committee and their Chairman who were entrusted with the organization of the exhibit on behalf of the industry.

It is not the quantity, it is the quality of the exhibit, that calls forth encomiums. No one can enter the two halls—the Rest Lounge and the Demonstration and Industrial Hall—so charmingly designed, so delicately coloured, with their simple gilt relief, and their appropriately furnished demonstration rooms, without being struck by a sense of abounding refinement—something so foreign to all the dirt, grime, and smell which some of the more enthusiastic but ill-informed electrical salesmen, led by certain ill-natured electrical papers, are wont to ascribe to gas. We rather think that after a visit to the Exhibit, there will be a proneness to lessen the display of ignorance and malevolence, if not a complete abandonment (which can hardly be hoped for) of rancorous statements. The memory of what is seen here must at any rate privately convict them of being the authors of false assertion, which other people smile at, and treat with deserved contempt. The host of people who will be visiting the display will know, if they read or hear such assertion, that it is false, as millions of experienced users of gas already well know it to be. We have heard the views as to the Exhibit of people who use gas, but have no other association with it; there has been consistent admiration. In fact, the general view is that for the public there is more that interests in the Gas Exhibit than in any other section in the Palace of Industry.

Why is this? It is because of the attractive manner in which the lessons of the utilitarian and efficient work of gas are presented. Every part is a picture with incorporated lessons, individually and collectively demonstrating the vastness of the part gas takes in the scheme and activities of modern life, and portending the still greater part that, in the domestic and industrial spheres, it is destined to take. Another thing we like is that there is no ostentatious thrusting of the lessons of the display upon visitors. The manner of presentment first attracts; and, almost without being conscious of the fact, interest is aroused in the main object, and the lessons are left in the mind to germinate and grow to the advantage of the industry. We are impelled by experience to the view that the manner of presentment is a large factor in the utility of such displays. It is the lasting impression that is most effective; and the surroundings and components of this Gas Exhibit have already been making, and will continue to make, indelible impressions upon the minds of all visitors. The testimony to this is growing; and we would rather have such testimony to success than all the opinions of the men of the gas industry aggregated and classified one way or the other.

On the great exhibition generally. The gaps of incompleteness are being rapidly filled-in. It is not to-day as on the opening day. More exhibits have been got into working order, but not all of them in the various Palaces and the Amusements Park. The gardens are in better condition. The roadways are being improved into permanent state. The much-boomed spectacular lighting effects by electricity are still unfinished; and some of the exhibitors were a few days ago bemoaning the fact that they could not get the electrical energy which they needed to drive their plants. Electrically there was an under-estimate of the amount of work there was to be done in a given time, and arrangements fell very much short of requirements. Thus it is that the contribution of electricity to the unpreparedness of the exhibition was of no mean order; and there has consequently been an impaling of electricity in both the public prints and the technical journals. But every day there is advance. In addition to use in the Gas Exhibit, by Messrs. Lyons & Co., and the Amusements Park, gas is utilized for a large variety of purposes by many exhibitors—upwards of 79—even in the Colonial exhibits, representing Canada, West Africa, Australia, New Zealand, Nigeria, and Hong Kong. Gas was there on tap as soon as required by any exhibitor.

The attendances at the exhibition have been growing—some days have witnessed tremendous numbers, though the weather has not been propitious. We crave the assistance of Old Sol now to assist in making a wonderful success of this centre of potential influence in the fortunes not only of the British Empire, but, through the British Empire, of mankind generally.

### Vision in Relation to Modern and Prospective Conditions.

THE field of our mental vision can only be extended by clear observation, investigation, thought, and an attempt to visualize the probable measure of the materialization of known potentiality. These things require to be cultivated in the

gas industry, so that the present may be made the ground of preparation for the future. In the concluding passages of his Presidential Address, delivered last Wednesday to the Eastern Counties Gas Managers' Association, Mr. E. F. Keable, of Gorleston-on-Sea, appealed for a larger vision throughout the industry. "Surely," he remarked, "no public service can wish for wider fields upon which to allow vision to have full play than our own." This no one can deny, despite the futile postulations of the purveyors of a competing agent that the world was made for them, and that their destiny is to occupy it, and entirely to banish their competitors. The Presidential Address of Mr. Keable shows good vision; and we heartily congratulate him upon the composition, which is alive not so much with counsel and advice, but with practices (from which counsel and advice may be extracted) which take count of already achieved changes in circumstances, and of certain—or as certain as mundane things can be—prospective enlargement of the volume of the gas business. In his own case, the President needed no compulsion to take measure of current and possible requirements, and to provide for them in the best possible manner. But had he wanted such compulsion, it would have been applied by the remarkably fine gas-sale increases which his Company have been experiencing, but which would not have continued had there not been definite action to effect radical alterations in the ability to convey and supply, and to ensure (as far as opportunities would allow) that the gas is used with the best possible efficiency.

The Company have a curiously shaped area of supply; and, being a seaside resort, the distribution system has heavy seasonal loads upon it, with rising peaks during the cooking hours of the summer days. At such times there was formerly a serious deficiency in supply; and when the matter of the reconstruction of the distribution system was under consideration, a factor not to be overlooked was the house-building possibilities in the Company's area. The outlook in this respect was good. The vision then exercised provides one of the interesting features of the address. There was no mere spot amplifying of the distribution system; but the President decided to supplement it by a high-pressure steel trunk main through the district. His experiences with this and with a steel main that preceded it show that the testimony from different gas-supply areas *pro et con* steel mains must not be taken to have general application. It will be of little value to give the details here of the main or of the compressing plant; those engineers who require them can satisfy themselves from the address. From time to time gas engineers have published statements which disclose a varied experience of steel mains; but Mr. Keable has nothing but good to say of them. There was last year an opportunity of examining an 8-in. low-pressure steel main which was laid in 1911. No repairs of any kind were necessary. The main, wrapping, and coating were in first-class condition; and the gauge of a section taken out for test purposes was found, although gases of different qualities had been carried, to be identical with that of the main when laid. It is more than likely that the varied experiences with steel mains are due not to the fact that the mains are of steel, but to the chemical characteristics of the soil being different. Analysis proves that the soil in which this low-pressure main and the 5-in. high-pressure one are laid is free from corrosive elements. In such friendly soil it is natural that long life should be the portion of the mains. But in a soil the elements of which destructively attack the protecting covering, a different tale is told. This means that if steel mains are to have general application for gas distribution, their producers must find a protective medium which will be serviceable in all sub-soil circumstances. They are working in this direction; and with promising effect, as the President understands that the time is not far distant "when an effective protective medium will be devised, procurable at a reasonable price." This will have a considerable effect upon the rapidity of adoption for gas-conveying purposes, because the steel mains have several features which render them highly suitable to stand the strain and stress of modern traffic conditions.

In dealing with this subject, vision must comprehend the changed circumstances of road usage—such as the rapid growth of heavy motor transport, and the employment of reinforced concrete in the construction of the roads. The high-pressure steel main required by the President had to be laid through a district in which a new by-pass road was to be made, but no definite plans had been formulated. Intelligent anticipation (guided by some friendly hints from Corporation officials) had to be exercised, with the result that, though the laying of the new main preceded the construction of the ferro-concrete road by three years, no alterations to it were necessary. When the increasing adoption of this form of road construction is considered, here again vision has to be brought into play in determining what is best done in new main-laying work. It is clear that Mr. Keable is very much in sympathy with the views of Mr. Stephen Lacey in this matter, as expressed in the paper he read last year at the Public Works, Roads, and Transport Congress; but what the former did long anteceded the publication of the views of the Distributing Engineer of the Gas Light and Coke Company. Mr. Keable's opinion is that road developments will in future make it necessary to lay mains under the footpaths—cost of road opening and reinstatement, public inconvenience, vibration, and so forth making this imperative. In the scheme, provision has been made for introducing mains under the footpaths, by laying mains transversely in the road, and capping them off, at points where large extensions are anticipated, so as to be ready for linking-up in the future. Mr. Lacey also spoke of service mains (fed from the trunk mains) laid under the footpaths. This, of course, will be expensive, but there are *per contras* in the shorter length of service-pipes and in avoiding the cost of breaking-up and reinstating the reinforced concrete. We have also seen the limitations in such work that the London Traffic Bill seeks to impose; and we know, too, of the movement on the part of local authorities, headed by the London County Council, to saddle gas undertakings with the costs of altering the position of their mains in the event of road work necessitating it. The President in this connection urged the importance of all gas undertakings throwing in their weight to assist the National Gas Council to watch and defend their interests in respect of this proposed unjust imposition. All these are matters which claim the exercise of vision. Before leaving the distribution system, the President had some favourable remarks to make as to welding steel mains. In clearing services, too, he prefers, in these days of internal corrosion, to extract deposits rather than force them into the mains.

The remarks of Mr. Keable on the development of the gas business were all very much to the point. Since 1917, all the appliances in his area have been overhauled and adjusted to suit the changed conditions of supply. Every new piece of apparatus is fitted with gas and air adjusters. He favours the education of consumers in the use of gas-cookers; and he has made a beginning in the work of inspecting gas appliances by personally visiting a few consumers weekly. In the President's opinion, the time is not far distant when it will pay many undertakings to deal with all the cookers on the district by the card system, with a staff sufficient to cover the whole number in a reasonable time. He suggests this could be accomplished by the aid of a specially covered-in motor van, in which stocks of spare parts could be carried, and minor bench repairs be effected. There are several other matters dealt with in the address, and particularly pertinent is the part treating of the reorganization of the stores. In all these matters, we have to develop our ideals and practices—not only making them consonant with current requirements, but giving them a good margin to compass those things which our vision warns us will have to be faced in the days to come.

## Court of Inquiry Report on Miners' Pay.

There may be some disappointment with the report (which was issued last Friday) of the Court of Inquiry—Lord Buckmaster, Mr. Roscoe Brunner, M.P., and Mr. A. G. Cameron—appointed by the Minister of Labour to inquire into, and report upon, the question of wages in the coal-mining industry and the matters in issue between the Mining Association and the Miners' Federation. But any disappointment must be attributed to the limitations of the reference. As, however, both sides were willing to abide by the findings of the Court, some satisfaction is to be found in the result. The report does not settle the questions in dispute as some had mistakenly hoped it would. The appointment was not made for arbitration purposes. What the Court have done is to clear the ground of brambles, and to give the two parties a clear space upon which to operate to effect a new wages agreement. It is stated that "the resumption of negotiations between the coalowners and the Miners' Federation with a view to a modification of the terms of the agreement of 1921, appears

to offer an immediate and practical means of effecting a new wages agreement." The owners heartily welcome this suggestion; and in view of the undertaking given by the President of the Miners' Federation (Mr. Herbert Smith), that they would stand by the findings, a satisfactory conclusion is expected from further meetings with the owners. The Miners' Executive met yesterday morning to consider the report; and in the afternoon they had a meeting with the owners to discuss the question of negotiating a fresh agreement based on the findings.

Apparently what will be done is to start *de novo*, seeing that at the inquiry the men's representatives made it clear that they no longer adhered to the proposals submitted in the negotiations, and that the claim they wished the Court to consider was a living wage, which should not be less than the rates obtaining in 1914, with the local adjustments since made to remove anomalies, *plus* the increase in the cost of living, and the increase of 2s. per shift recommended by the Sankey Commission. An important finding is that there are very few cases in which it can be found that the wage rates have reached a level equal to the 1914 rates, *plus* the percentage increase in the cost of living. But the coalowners during the inquiry submitted that the 1914 wages were high for that time; and the Court are of opinion that they are right in this contention. In expressing this view, Lord Buckmaster and his colleagues had previously referred in the report to the advantages the miners enjoy in respect of house coal and often house accommodation. But even taking these privileges into consideration, the Court are of opinion that the minimum rates of the day-wage workers are still below the level of those of 1914, *plus* 75 p.ct. On the point as to whether or not wages were high in 1914, the Court remark that, so far as the underground men are concerned, the risks attending their occupation and the conditions of work have to be brought into consideration in questions affecting wages. It is principally, then, day-wage workers, and pieceworkers in certain collieries, but not in all, who are receiving less than the equivalent of their pre-war earnings, *plus* the 75 p.ct. As the report points out, however, it is not really in dispute that the agreement of 1921 has failed to provide an adequate wage in many of the poorer districts. But while the agreement has operated, with certain classes of workmen and certain collieries, in giving wages less than their pre-war equivalent, it has allowed to the owners profits substantially in excess of their pre-war ones.

It is clear from these facts that the real issue, though primarily exhibited in a request for increased wages, is far more fundamental. But that is a matter with which the Court were not concerned—in fact, they point out that it is purely a political question. Nor are they able to express any opinion as to the economic possibility and effect of increasing the price of coal or of reducing the costs sufficiently to enable the present claim to be met. There is no expression of opinion on the part of the Court as to the figures the owners laid before them which showed that per man the total output now is not as great per shift as in the immediate pre-war year when the eight-hour day ruled; but the report does state that, making allowance for the reduction from eight to seven hours a day, the output is now higher per man. Therefore, when the Court assert that they think the owners were right in submitting that the 1914 wages were at a high level, a further discount from those wages should be made for the difference (about 2 cwt. per shift) in the work per man between now and then, if those pre-war wages are to be taken as a basis. To adopt them for basic purposes in the circumstances of being high then and less work now being done, would be unfair, especially as it is obvious that the consumer has to pay all additional cost charges. This is particularly emphasized by the statement in the report that "looking at the industry as it is to-day, it appears from the figure before us that, under present conditions, the profits of the industry, particularly in some districts, are unable to meet the miners' claim in full." This being so, both the miners and the owners will have to forego something in effecting a new agreement; and probably the consumers, too, who unfortunately are still paying more than 75 p.ct. above the pre-war prices of coal, and are faced with the fact that, when industrial activity is again at high tide in this country, combined with the demand for coal as it has been (say) the last twelve months or so, the output of to-day will not suffice. When demand exceeds supply, we all know what happens. Touching the point as to the profits of the industry being unable to meet the miners' claim in full, one part of that claim is the retention of the allowance made by the Sankey Commission of 2s. per shift to adults and 1s. to boys. Regarding this, the Court feel that they are incompetent to tell what was the actual purpose of the 1919 Commission in granting this. The Miners' Federation claim that it was given for the purpose of raising the standard of living of the mine workers. Another point affects the earnings of railway wagons and the profits from coking and bye-product plants. The Court reject the miners' claim that these should be regarded as proceeds of the industry. In fact, they say: "Where these "undertakings are separately owned, we do not think their "profits can be included, nor apart from agreement does "the principle differ where they are under one ownership." However, the Court lay down the principle that "provision of a minimum wage should have precedence over distribution of profits." But they cannot specify the conditions as to the basis on which a minimum wage should be fixed, nor are they competent to express an opinion on the men's submission that any standard of profits should be at a fixed rate per ton equal to the pre-war profits per ton.

The Court have done their work promptly; but the limitations of the reference project themselves throughout the report. There is much more upon which it would be of advantage to have had the opinions and the guidance of such a wholly disinterested body. But the report covers ground, and makes pronouncement, sufficient to show that it will be necessary for both sides to concede something, and that it will be better to abandon former claims and offers. Then, with the guidance of this report, they can start afresh on the quest for ways and means of reshaping the terms of the 1921 agreement so as to make of it an acceptable and durable covenant. But the more sober-minded of the men's leaders enter upon the task of revision with the knowledge that their extremist colleagues regard the report as a non-committal and somewhat anæmic one; and they want to utilize the position for pushing forward the claim for nationalization and a larger control of the mines by the miners themselves. In fact, it is expected that on Friday the House of Commons will be discussing the Nationalization of Coal Mines Bill, which is a private member's measure; and the Government are being urged by the mining element to support the measure. It is manifest that the week will be full of interest in respect of coal.

## Peace in the Gas Industry.

When there are strikes, threats of strikes, and a large measure of unrest in several quarters of the labour world regarding wages, it is a satisfaction to view the peace that reigns in the gas industry. That this is the position is due to the existence of the Federation of Gas Employers and unions representing the employees, who are as keenly alive as the employers to the fact that their functions are not to create discord, but, if possible, to preserve peace by mutual decisions based on the principle of justice to both parties. In the National Joint Industrial Council for the Gas Industry, we have a pattern body—a body which examines matters from both sides. It was due to this that a couple of months ago a resolution was passed by the Council which ensures that there will be no disturbance of good relations in the industry for some time to come, and not then, we are confident, with the men still in office who have proved themselves so capable of arriving at mutually satisfactory decisions. The resolution alluded to was to the effect that the agreement entered into on Jan. 15 with regard to the regulation of wages should remain in operation until Dec. 31, when three months' notice may be—not "shall be"—given to terminate it. Thus the agreement cannot now cease to operate until April 1 next year.

## "Gas" Explosions and Electricity.

It would be just as well if the daily newspapers, when referring to explosions of gas, would indicate the nature of the gas. We saw a paragraph the other day headed "Gas Explosion in a Hospital." On reading it, it was found that it was a bottle of ether that had exploded owing to ignition by an electric spark from some apparatus that was being used in the operating theatre of the Cheltenham General Hospital. Last week, too, we read of a "Gas Explosion in an Electric Culvert." Here, again, investigation might have shown that there had been a fusion of a cable, gas had been generated from the insulating covering, and the electric current itself had caused the explosion. When laymen read these things, they naturally jump to the conclusion

that town gas was concerned. Town gas has a pretty broad back; but it does not want to be blamed for occurrences of this kind in which it has had no part.

### Beet Sugar Growing.

The development of this agricultural pursuit will supply an additional useful market for sulphate of ammonia. There is a growing interest in the matter; but the Government are not showing alacrity in revealing what they are prepared to do in the way of fostering the new industry. Part of our domestic policy should be to make this country as self-reliant as possible. Replying to questions in the House the other night, Mr. W. Graham (Financial Secretary to the Treasury) stated that there is no proposal to interfere with the absence of excise duty on home-grown beet sugar. The next consideration is whether the Government will be able to do anything for the industry in Great Britain by way of agricultural credit or co-operation; and then there are further possibilities under the operation of the Trade Facilities Act. Mr. Graham is not without hope that there will be in the future an opportunity of extending those guarantees, and under that head the Government may be in a position to encourage the production of home-grown sugar. He was, however, unable at this stage to state definitely the policy of the Government. While the Government have very carefully in view the large fiscal issue involved, and can give no pledge, they are not, he says, blind to the importance of the industry, and the matter will not lack their sympathetic and careful consideration.

### Engineering Industry and Current Policy.

There is good reason to pause and consider our present political and domestic situation. One of the greatest factors in the domestic situation is the condition of our industries; and that that condition should be maintained at the highest possible standard is a matter which seems to be largely overlooked by the present Government, whose chief ambition appears to be the very limited one of improving the position of the industrial workers, and by means which cannot fail to produce a deterioration of the vitality of our industries. As this develops, it must follow that the power of employment (bad as it is in these days) must also further depreciate. There was a luncheon recently by the British Engineers' Association to celebrate the successful accomplishment of the organization of the Shipbuilding, Marine, Mechanical, and General Engineering Section of the British Empire Exhibition. The principal guest on the occasion was Lord Weir, the President of the Society of British Gas Industries. In the course of a speech, he made reference to the industrial conditions which claim examination from both the political and social points of view. Looking at the Palace of Engineering at the Exhibition, he pointed out that it reveals the fact that British engineering and metallurgical practice is able to deal effectively with the equipment of any and all of the world's industries in every technical direction. It discloses, too, that as regards inventive ingenuity, sane design, sound material, and unquestionable workmanship, we are second to none. While it refutes any charge of decadence or slackness in technical progressiveness, it is in no sense a reflection of any degree of true prosperity. Behind the Wembley picture, there is unemployment, keenness of competition, difficulty of obtaining contracts, and the unstable faith and confidence of the consumer. Combined with these facts are demands for wage increases, and higher prices of coal with a consequent increase in the costs of all raw materials. In view of this position, are we justified in regarding the present situation as a trade slump of abnormal duration, or are we faced with a new situation in the British export industries, brought about by the influence of definite changes in our economic system, which, without readjustment, may render permanent our present difficulties?

### A Joint Industrial and Social Policy.

It is Lord Weir's profound conviction that we can no longer afford to allow the present widespread ignorance among certain sections of our community as to the effects and influences of these changes. We ought to know where we are being led—for example, if immediate social reform is to be regarded as of more importance to the nation than a healthy position in the producing industries. It seems to us that the Government have not grasped the fact that the wherewithal for social reform can only come from prosperous industries. Lord Weir says, if it is for the ultimate national good that a bricklayer should work 44 hours a week at high wages, and have his employment guaranteed for fifteen years by the State, while the skilled engineering population is only partially employed at 47 hours with low wage rates, then let those who govern us submit some evidence that this policy is going to lead to prosperity, because many of us are too old-fashioned, or possibly too ignorant, to grasp such a sequence. Our need to-day is for a national industrial policy which will march along with a social policy. His Lordship warns us that, if we remain much longer without it, the export industries on which our people depend for their food may reach the same hopeless position as that of British agriculture. The Chancellor of the Exchequer says that much of the relief in taxation which he proposes will represent new and additional purchasing power. That is sound enough if we have any evidence that the purchasing will provide employment at home. On engineering work the domestic industries have been founded; but it would appear that the engineering section, on which the whole economic edifice rests, is to receive little effective consideration in national policy. Is it not possible to have some unity in the policy of our national effort? Can nothing be done to reinstate the policy that productive employment is of more importance to Britain than making unemployment an attractive proposition? In the interests of industry as a whole, Lord Weir asked the Government to examine the economic changes which affect our export industries, to obtain the facts and data, correlate them, and present the picture to the community. This would be good fundamental work. But should the remedies prove unpalatable, then the Government may be asked to guide the electors, instead of bribing them. Lord Weir asks the Government meanwhile to stop putting new furniture into the house, in case the floor gives way.

### Charges at Railway-Owned Docks.

The Harbour Docks and Piers Temporary Increase of Charges Acts (which gave various dock authorities power to levy increased charges) will expire in February, 1925. In view of this, and having regard to the fact that various cost factors still show a substantial excess above pre-war levels, the Railway Companies made application by Bills and Provisional Orders for permanent increases of their charging powers. The general feeling of the Traders' Co-ordinating Committee on Dock Charges (representing the Chamber of Shipping, the Federation of British Industries, and other bodies) was that the time had not yet arrived for stabilizing dock and harbour charges. The future course of prices is so uncertain that any maximum now fixed may well become quite unsuitable during the next few years. The traders also objected to the fact that the Railway Companies were asking for power to increase their charges to a level of 75 p.ct. above the statutory maxima existing before the war. In many cases the maxima had been fixed a long time ago, and indeed were in some cases entirely obsolete. The traders therefore claim that any percentage increase now granted should be above actual pre-war charges, and not above the statutory maxima, while objection was taken to a provision in the revision clauses whereby it was rendered impossible for a revision to be obtained within twelve months after any Order fixing the rate or rates concerned.

### The Agreement.

The Traders' Co-ordinating Committee on Dock Charges have been negotiating with the Railway Companies for some considerable time past. Petitions were lodged by the Committee against the various Bills and Orders; and a settlement has now been arrived at on the following lines: The provision for a percentage increase is abolished; and the Railway Companies are to be able to continue charging for five years at the present level, subject to the right of either party to apply at any time to the Minister of Transport for an Order revising the charges. The traders have agreed to the retention of the interval of twelve months (referred to in the preceding paragraph), on the understanding that the Railway Companies will be ready to confer periodically with the traders in regard to the level of rates as heretofore. Agreement has also been reached in regard to the form of revision clauses; and it is hoped the Minister of Transport will endorse these clauses to provide for a reference by him to the Sub-Committee of the Rates Advisory Committee which is now in existence, or to some other similar Committee—that is to say, a Committee consisting of the persons constituting the Railway Rates Tribunal, with the addition of persons experienced in shipping and port administration.

## PERSONAL.

Mr. W. E. Harris has resigned the position of Engineer and Manager to the Swindon United Gas Company, having decided to go into business on his own account in the town.

## OBITUARY.

### KENNETH PHIPSON HAWKSLEY.

Mr. Kenneth Phipson Hawksley, whose death was announced in last week's issue of the "Journal" as having occurred on the 2nd inst., at the age of 54, was a son of the late Mr. Charles Hawksley, and grandson of Mr. Thomas Hawksley, F.R.S., the first President of the British Association of Gas Managers. Both his father and grandfather became Presidents of the Institution of Civil Engineers, and he himself was elected to the Council of that body in 1921. He was also, among many other scientific societies, a member of the Institution of Mechanical Engineers, and of the American Society of Civil Engineers.

Mr. Kenneth Hawksley was elected a Director of the South Metropolitan Gas Company at the meeting in February, 1910; and on that occasion the Chairman (Dr. Charles Carpenter) pointed out he was a member of the firm of civil engineers of that name who, for at least three generations, had been engaged in the construction, financing, and management of gas and water undertakings, so that he brought to the Board an experience that could not fail to be useful.

Almost his last work before he was seized by illness was to lay down the lines of a great impounding reservoir for the Durham County Water Board. In addition to the South Metropolitan Gas Company, he was a Director of a number of other companies, on the boards of all of which his services were highly valued.

## ELECTRICITY SUPPLY MEMORANDA.

"First impressions count for much in exhibitions as in personalities; and it is a matter for congratulation that from whichever point of the compass the visitor approaches the Palace of Engineering at Wembley, he is at once impressed by the variety of the exhibits and the excellence of the display." These words appear in the "Electrical Review" in an editorial article on the British Empire Exhibition. We agree with our contemporary, and also acknowledge that the electricity industry is represented in a remarkably fine manner in the plans for spectacular and other lighting, and in the variety of exhibited plant which demands electrical energy to drive it. But there is a temporary depression in the electricity supply industry over the incomplete state of the scheme of lighting at the opening of the exhibition; and it is not yet finished, or was not a few days ago. There is also chagrin over the fact that many of the exhibits have been standing dormant owing to their inability to get connected up with the supply; and the exhibitors have not been making their remonstrances in secret. Many stands and some of the buildings, too, have not been in a condition for inspection after dark, and certain of the wonders of the Amusements Park have not yet been capable of movement, due to the absence of energy. Everything will, of course, right itself in time. But, whatever the cause, electricity stands charged with having contributed largely to the backwardness that has been experienced at Wembley. This is profoundly regretted in the electricity industry; and all that can be done now is to make amends as fast as possible by completing the work. It is true "first impressions count for much in exhibitions as in personalities." The first impressions as to the unavailability of electricity at the exhibition, it is feared by some, will not be an advantage to the industry, though not long since some big drums were being noisily beaten to let all and sundry know what immense things the industry was going to do. It has not assisted the exhibition to start off promptly in full glory.

**First Impressions at the B.E.E.**

**Criticism of Electrical Writers.**

The cause of this inceptive failure to meet requirements is attributed to this and that. The truth is there are several causes—the "Electrician" describes the failure as "an unfortunate concatenation of circumstances." This confession indicates a want of organization to deal with abnormal conditions, which were well known long ago. The "Electrical Review," on May 2, said that the deficiency would be made good in a week or two. In the issue of the "Electrical Times" on May 1, the writer of an article on the exhibition said that "one great difficulty which impedes the well-meant efforts of your correspondent, is that there is practically no power available, and in parts no lighting." And "Meteor," in the same issue, says "there are several initial faults in the exhibition from the electrical point of view. . . . They are caused by unpreparedness, whereof the origin is complex." The fact is sufficient; the complexity too much for our dear friend to describe in detail. He also adds that "the lighting is extremely gloomy—so far." Then the lofty wisdom of our meteoric colleague beams forth, when he gives as the reason for the gloominess: "Of course that is because it is not there." The "Electrician" regards the failure to have a supply of electricity ready at the beginning of the exhibition as the one real blot on the electrical enterprise. Pessimistic is a correspondent in the same paper, who signs himself "Indignant." He thinks that, unless the "serious failure" is instantly repaired, it will more than counteract all the benefits which the electrical industry expects to receive from its well thought-out individual and co-operative displays. And the failure is more important because it affects not only the electrical industry, but the exhibitors from other industries—the British and other Government pavilions, the side-shows, &c. This all reveals a widespread feeling in electrical circles that the failure to cope with requirements *ab initio* is a genuine reflection upon the industry. The criticisms in our electrical contemporaries are no doubt couched in the most modest language; but they would not have been made if the facts were not so obvious. That they are so, would have rendered futile the application of whitewash. There is no doubt that, privately, criticisms have been of a far more scathing character. "First impressions count for much," as the sage "Electrical Review" says. One impression that has been made upon us is that those responsible for the electrical equipment underestimated what would be required in man-power and material to meet the needs which must have been approximately known some time ago.

**Spectacular and Other Lighting.**

One of our contemporaries states that, with the exception of the Amusements Park, the whole exhibition is electrically lighted. It might have added "and the Gas Exhibit" in its splendid self-contained building in the Palace of Industry. The gas lighting to be seen in both places will prove to all but the most obtuse electrical mind that gas lighting is not dead or even sleeping. We have not the slightest doubt that, when the electric lighting scheme is finished, it will be a gorgeous spectacle. It is not to be an ordinary demonstration of illumination; it is to be a demonstration of lavishness, which is a far different thing from utility. And we have no doubt it will cost a pretty sum. The installation alone will do that; and the running and maintenance expenses will ensure a bill which will make the exhibition authorities cognizant of the fact that a superabundance of illumination digs deeply into money. However, it will constitute a big night attraction—when completed. The work is in the hands of Mr. Haydn T. Harrison; and many an illuminating expert no doubt wishes he had had the same opportunity. Every one of them, there is no question, believes he could have done it better than the man to whom it has been entrusted. The rules which the expert has followed are that there should be ample illumination without glare; that it should not detract from the bold architectural features of the buildings; that beauty rather than brilliancy should be achieved; that the sources of light should not be conspicuous. Alternating current, feeding gasfilled electric lamps, is used throughout for lighting. The more important buildings are to be flood-lighted; but in order that the powerful sources of light should not be visible to the public eye—the public not wishing to be blinded—it was decided that in no case should the rays reach to a lower point than 10 to 15 ft. from the ground; the lower parts of the buildings being illuminated by lamps on ground standards. The flood lights, it is said in one paper, will alone represent a maximum of 600 million candle power, and the general lighting will have a diffused illumination of about 6 million candle power. We beg of our readers not to quote us as an authority for—at any rate—the 600 million candle power. However, great things will be looked for in the spectacular lighting, which must not be confused with mere utility lighting; and beautiful effects will be anticipated by the gradual varying of the colour of the flood lighting on the charming façades of the buildings. This will, the "Electrical Review" tells us, be accomplished by using three circuits connected through a central dimming station, with three sets of projectors fitted with coloured screens. The ground lighting is effected by 700 lanterns of special design, intended to give 600 to 1500 candle power. There is also group lighting of large areas with 5000 to 10,000 candle power combinations. The spectacular lighting of the artificial lake is not yet complete. The interior lighting is generally by gasfilled lamps. Electricity is also used in the kiosks, both for lighting and for demonstration purposes. The Exhibition Fire Brigade were called out on Monday of last week to a fire in a kiosk in the Amusements Park. The kiosk was practically burnt out; and one of those newspaper reporters who, in the electrical mind, have imaginations which will not permit them to keep to the path of truth, states that it is believed the fire was due to a defective fuse-box.

**"E.D.A." Exhibit.**

Naturally, the electricity supply industry is expecting remarkable results from the "E.D.A." display in the Palace of Engineering. This has an area of 10,000 sq.ft.; and it has been produced on behalf of 250 contributors. We fail to gather whether our electrical contemporaries are altogether pleased with what has been done—whether or not the result squares with their anticipations. But already, though the great exhibition is still unfinished, there is talk of extraordinary effects for electricity. The "Electrical Review" says the excellent work of the "E.D.A." has

borne good fruit; and there are millions of people in this country and from overseas who will realize for the first time at Wembley the achievements and the possibilities offered by electrical engineers and manufacturers. The "Electrician" states that ever since the opening of the exhibition the "E.D.A." section has been thronged with visitors, and the number of genuine inquiries and actual sales have been satisfactorily large. The "Electrical Times" says with "the conception and character of the display, and the manner in which it has been carried out, we have no fault to find." That does not read like superlative praise. In fact, this contemporary points out that there are some fine efforts by manufacturing firms acting independently, and visitors are advised not to allow the "E.D.A." exhibit to absorb all their interest. There is a word of regret, too, that some of the leading manufacturers of like products are not represented at the exhibition; and therefore this causes the display to be incomplete. However, the show organized by the "E.D.A." is described by the "Review" as one of the finest of the examples of co-operative effort; and it is especially fascinated by the range of rooms in which are demonstrated the household applications of electricity. These are points which could be criticized; but there is no intention on our part to say things which might appear churlish, when we know the best has been done in the circumstances.

**Lighting of the Theatre of the I. of E.E.**

One of the strangest things in connection with electric lighting is that the theatre of the Institution of Electrical Engineers should be so abominably illuminated by electricity. It ought to be an example to the occupiers of all such premises; but it is far from that. From the time the theatre was first brought into use by the Institution, the members have complained of the lighting; and there have been some pretty open and frank references to its inadequacy. "Meteor" of the "Electrical Times" has again called attention to the profoundly melancholy character of the lighting. Apparently the hesitation to remedy the deficiency has been due to a reluctance to give offence to those who drew up the original specification, because it is remarked by our electrical colleague that "several years have elapsed since it was first specified; surely nobody need be offended now if it were brought up-to-date." Our friend fears that the Council do not realize how frequent and emphatic are the complaints. But the Council do not keep themselves aloof from the rank-and-file of the members; and they are not always members of the governing body. The lighting must be very bad when "Meteor" could publish this on May 1: "Several members, only four or five rows back, could not distinguish the features of Dr. Ferranti or Dr. Russell last Thursday." He adds that it is not that just a little reinforcement is required. "If the lighting is still to be indirect, then four or five times the candle power is necessary. . . . As matters stand, the gloom is dismal and depressing." People who do not know how to light their own homes efficiently cannot advise others how to light theirs. There have been many electrical people who have held that with indirect illumination no more light need be provided at the source than with direct lighting. Those people have failed to realize that with the indirect system there must be some loss.

## THE USE OF THE AFFIX "A.M.Inst.C.E."

The Secretary of the Institution of Civil Engineers calls attention to a report which appears in "The Times" for May 3 of the case of the *Institution of Civil Engineers v. Dey and Roy*. The matter is one of interest to members of the gas profession. The case came before Mr. Justice Tomlin in the Chancery Division. It took the form of a motion by the Institution of Civil Engineers against Birendra Nath Dey and Promod Nath Roy for an injunction restraining them from using, or allowing to be used, after or in connection with the name of B. N. Dey, or in connection with any profession or business carried on by them, and from printing or writing on any document issued and published by them or either of them, the words "Associate Member of the Institution of Civil Engineers," or any letters, words, or designation to the same effect. Counsel appearing for the plaintiffs were Mr. Rolt, K.C., and Sir Hugh Fraser; and for the defendants, Mr. E. C. Morey. It was pointed out by Mr. Rolt that the subject of the plaintiffs' complaint was that the defendants had employed after the name of Dey the description "A.M.Inst.C.E." in the printed headings of letter paper. This was not justified. Counsel, however, understood that defendants were willing to treat the hearing of the motion as the trial of the action, and to submit to a perpetual injunction in terms of the notice of motion and pay the costs. Mr. Morey said that this was so. Mr. Justice Tomlin made an order accordingly. Mr. Morey stated that he was instructed to say that the description had been inserted in the headings of a few letters by inadvertence.

**The German Gas Association.**—The sixty-fifth annual general meeting will be held this year at Nurnberg, on June 26 to 28. Details of the programme are not yet available, but will be published in due course in "Das Gas- und Wasserfach," the official organ of the Association.

## ENGINEERING AND DISTRIBUTION PROBLEMS.

### Mr. W. W. Atley's North of England Association Paper.

Unfortunately, in our report of the discussion in last week's issue [p. 392], on the paper read by Mr. W. W. Atley, of Stockton-on-Tees, at the annual meeting of the North of England Gas Managers' Association, some slips were made in the remarks of the President, Mr. J. Kelly, of Bridlington. We therefore take this opportunity of reproducing Mr. Kelly's statement in full.

The PRESIDENT said they had had a very interesting paper from Mr. Atley, and the best way to thank him was to have a good discussion on it. They had not had an opportunity to read it beforehand, and this was a disadvantage in discussing any paper. Many, like himself, had probably had experiences similar to those related by the author with regard to naphthalene. He had gone through the same stages, and had used similar methods of clearing holder inlets and outlets, as well as mains in the town. He (the President) had found on one occasion that the holder inlet pipe was blocked with naphthalene, and steaming melted it down to the syphon, from which it was difficult to remove. On another occasion he used about 100 gallons of benzole or petrol, steaming it into the inlet. Shortly afterwards there was a bad block in the holder outlet, which had to be treated in the same way. He found that on steaming petrol or benzole into the inlet pipe some of the naphthalene was carried forward into the holder and was deposited in the outlet pipe. With regard to clearing mains he had only one experience, and dealt with it as Mr. Atley did, running petrol in at the highest point and pumping out at the syphons on either side. Naphthalene was a very elusive thing. They did not understand why, when working under apparently precisely similar conditions, sometimes there would be no trouble with naphthalene and at other times quite a lot. The best plan was to take it out before it got to the holder, as Mr. Atley had suggested; for if it was in the gas, they only wanted a slight change in temperature and they might find it depositing out. It was strange how they might have naphthalene troubles in one locality and not another. Sometimes only one service in a street would be affected. This might be due to turbulence set up by the rough end of the service pipe projecting into the main. He had now made it a rule to have all services screwed proportionately to the thickness of the main, putting on no more threads than were necessary to ensure that the service pipe did not go through and project into the main. Where there were naphthalene troubles, this was a wise precaution. Mr. Atley's method of dealing with the governor inlet valve was a good one. Work of this kind gave great anxiety, as he found when on a similar occasion he used double bags, and it was a great advantage if temporary valved connections could be used. With regard to cyanogen, Mr. Atley's method was a simple one; but he must confess he did not quite understand why water should effect the complete removal of cyanogen and liquor did not. He would like to know whether, when cyanogen was extracted in the purifiers, it affected the condition of the oxide and its capacity for sulphur extraction. He should have thought it would reduce the activity towards $H_2S$ rather than increase it, whereas Mr. Atley said that when it was extracting more cyanogen it was also extracting more sulphur. The pan-ash washing plant spoke for itself. It seemed to have been well worth while at Stockton. He thought that such a plant would pay for itself at large works, but in smaller ones it might not be worth the capital outlay. Mr. Atley worked his with two men, whereas at small undertakings half-a-man would be more than sufficient to deal with all the pan ash they could get. The gas-fire propaganda at Stockton was very interesting. The life of a gas-heater, however, was not equivalent to that of a cooker; and the adoption of a simple-hire system at Mr. Atley's rates would have to be justified by a largely increased demand for gas, and, of course, an increased profit sufficient to provide a sinking fund. It seemed to be well justified at Stockton, where the increased sale of gas was about 20 p.ct. This might enable a sinking fund to be established that would provide for the installation of gas-fires. Simple hire alone on a 10 p.ct. rate would not do this. Before any undertaking went in for a simple-hire system on such low terms, it would need to be very sure that it would get a sufficient increase in consumption to provide the necessary sinking fund. Mr. Atley, however, could be congratulated on the results of what he had done at Stockton.

### *Avis!*

Our excuse for hereby recording our astonishment at the contents of Circular No. 52 of the Distribution Committee of the Société Technique de l'Industrie du Gaz en France, is the warning of our readers to prepare for an inquisition on the subject in Paris. The circular asks, by an extended questionnaire, for information regarding "the substitution of wrought-iron or galvanized for lead tubes in service-piping and installations." Our friends realize that other countries have long made it a practice; but they seem till now to have overlooked the matter, although France is dependent on foreign countries for practically all her lead, and iron services are so much cheaper and likely to become more so. It is a coincidence that a misprint (in the reproduction of the circular in our contemporary "Journal des Usines à Gaz") dates the circular April 12, *1914*.

**The Royal Sanitary Institute.**—The thirty-fifth Congress of the Institute will be held at Liverpool from July 14 to 19, during which time a Health Exhibition will also be held. Already 500 delegates from 275 authorities, representing foreign and colonial governments, Government departments, county councils, boroughs, urban and rural councils, port sanitary authorities, &c., have been appointed. Many subjects will be discussed, and visits have been arranged to works and institutions illustrative of the sanitary administration of Liverpool and district.

# BRITISH EMPIRE EXHIBITION NOTES.

### Wembley in the Sun.

Those who have not yet been to Wembley, and can select their own time, may be advised to choose for their first visit—it is assumed that they will make several—a day on which the sun is shining. That things look better in brightness than in shadow may be taken as of general application; but with Wembley it seems to be particularly the case. Wembley in the sunshine is a totally different place from Wembley under a leaden sky; and though the doubter may scoff at the possibility of "love at first sight," it is undeniably true that first impressions count for a very great deal. Therefore, as the Exhibition is a thing to abide in the memory while life lasts, make up your mind to be introduced to Wembley, if you can, when she is to be seen to the best advantage.

#### PROGRESS TOWARDS COMPLETION.

Last Friday was such an occasion, and it was disappointing to find that greater numbers did not avail themselves of it. However, the fickle weather of previous days had not been such as to inspire confidence; and would-be visitors had reasonable excuse for fearing that the sunshine might not outlast the time that would be taken by them in reaching Wembley. But one hears it said that remarks in the Press regarding the unfinished state of the Exhibition are keeping people away. They need not have any such effect, for though in many directions the finishing touches—and in certain respects something more—have yet to be applied, no one can justly complain that there is not now enough to see and to do. Matters are being rapidly pushed on, and after an absence of about a fortnight the progress made in the interval impresses itself strongly upon one.

The provision of additional free seating accommodation in the grounds was a small matter—though not so small, perhaps, as may at first sight appear—upon which the authorities are to be congratulated.

#### AT THE GAS EXHIBIT.

All visitors to the Exhibition go to the Palace of Industry, for it is of absorbing interest. The title is a wide one, and in this instance it embraces much. Some things appeal to one visitor, and some to another; but the Gas Exhibit appeals to all, and so it is not surprising to learn that it is securing its full share of attention. Wembley is a tiring place, and the Rest Lounge, with its comfortable armchairs, is much appreciated by the weary visitor. The public dearly love a "live" display, and the working exhibits are a source of much attraction. Many a housewife will have cause to be thankful for having passed into the Exhibit and picked up some useful "wrinkles"—of the kind that she desires, not of the kind that she dreads—at the cookery demonstrations which proceed throughout the day. The industrial appliances in operation, too, are always surrounded by an interested throng of people. That they are interested is clear from remarks overheard; and it is also evident that visitors are greatly impressed by the varying applications of gas to industry. Popularity is enjoyed equally by the oxy-coal-gas cutting plant, the aluminium casting, the pottery firing, and the sweet making.

"The Seven Ages of Woman" is a feature that is commented on favourably by the visitors, who note carefully the practical demonstrations of labour-saving devices in different spheres of domestic life. The present-day dearth of servants has brought about a pressing need for the easing of the housewife's burdens, and the questions put at the Gas Exhibit make it apparent that the mistress of the home is constantly seeking information as to how to lessen her expenditure of effort, time, and money.

Further acquaintance by no means diminishes one's admiration of the deliciously soothing effect of the general scheme of lighting in the Rest Lounge. The excellently diffused illumination is on novel lines, and it is extremely effective. Nothing but praise has been bestowed upon this lighting, and many people have asked how it is done.

The hotel kitchen, of which an illustration is given, is fitted up with every gas-appliance that contributes to successful catering in a large hotel or restaurant. There is a coke-boiler for hot water.

#### SMOKE ABATEMENT.

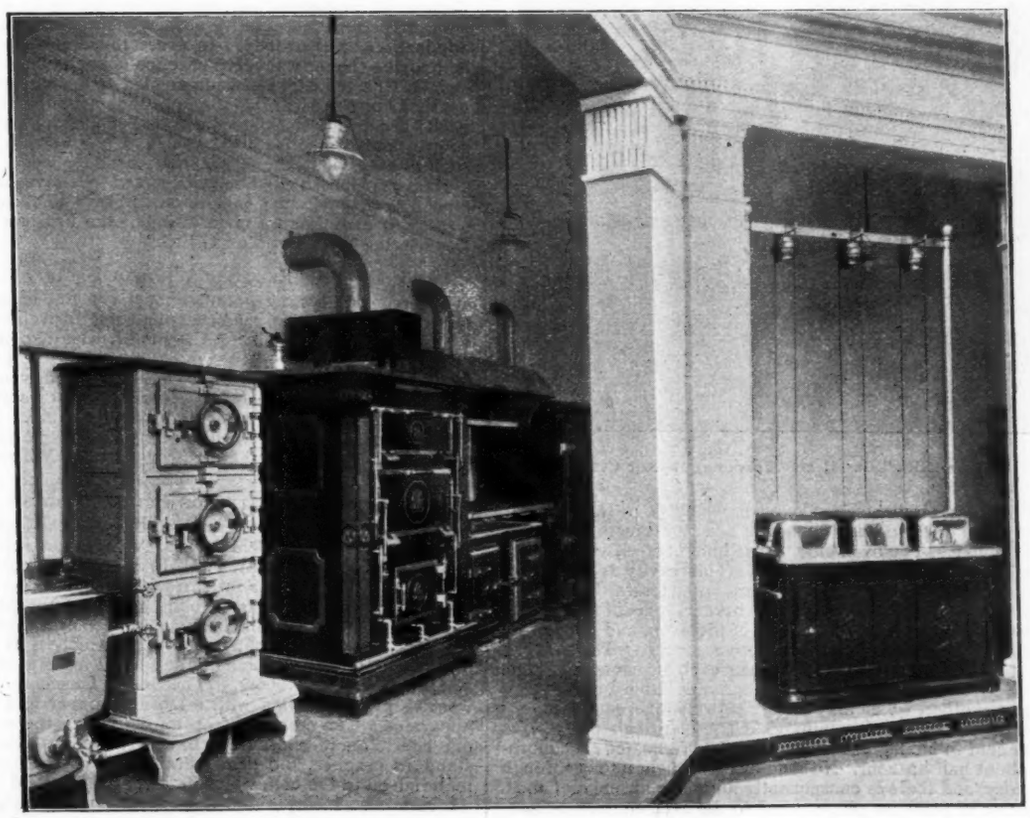
The smoke abatement display on the outside of the building—to which detailed reference was made in our original description of the Gas Exhibit in the Special Exhibition Number of the "JOURNAL"—is, of course, one that appeals to thinking men and women far more than an ordinary arrangement of apparatus, because it links-up the public health idea, and draws attention to what is essential for the general good of the community.

#### SOME POINTS OF INTEREST.

Before reaching the front entrance to the Gas Exhibit, the eye is caught by the glass cases containing the Lovett collection of old lamps and other objects illustrating the history of lighting. There is also a first-class model of the Old Whitefriars Gas-Works on the Victoria Embankment. These works were closed about 1869. The National Benzole Company contribute a model depicting the production of "National Benzole Mixture" from "the colliery to the can."

#### OPPORTUNITIES MUST BE FOLLOWED UP LOCALLY.

Those in charge of the Gas Exhibit are agreeably surprised at the number of inquiries that have come through, seeing that the Exhibition has been open so short a time. Many of these are important inquiries, and they are not confined to London by any means, having come from residents in all parts of the British Isles, as well as from overseas. They are both domestic and industrial



[*Photo. by Campbell Gray.*

A HOTEL KITCHEN TYPIFIED AT THE GAS EXHIBIT.

which, of course, suggests possibilities of big business developments. These inquiries are forwarded for attention to the gas undertakings concerned, while the overseas ones are sent to the manufacturers of the apparatus to which the inquiry relates.

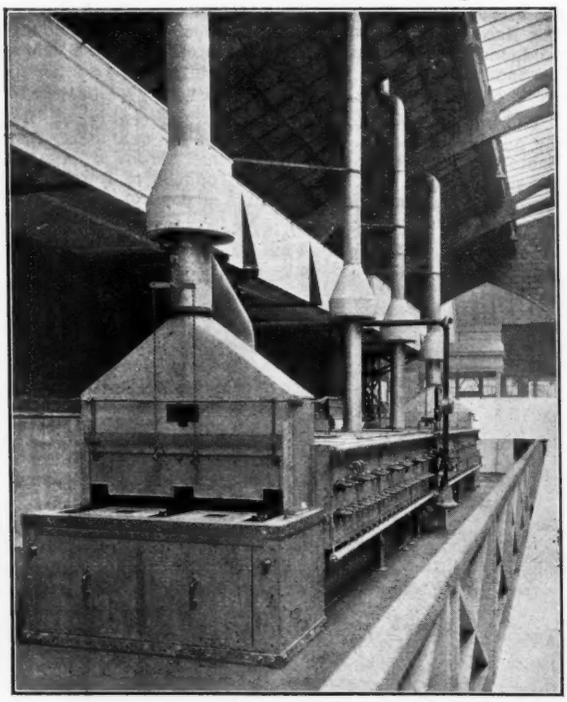
Opportunity may be taken here to emphasize the fact that all the efforts of Wembley will be wasted if the opportunities thus created are not followed up locally, and the most made of them.

### Aluminium Castings.

In last week's "Journal" (p. 384), a photograph was published, which, through an oversight, had appended to it the descriptive line "A Pottery Demonstration in Progress." The line should have been "Aluminium Casting." We regret the error.

### The Age of Gas.

In the Palace of Industry there are many excellent examples of the use of gas in the production of foodstuffs. Before visiting Wembley, we wonder how many people thought of the important part which gas plays in the manufacture of chocolates and the baking of bread and biscuits—to take two examples from a host of applications of gas in this particular field. After viewing the demonstration of Messrs. Baker-Perkins, Ltd., and visualizing the cleanliness, efficiency, and speed of working of the gas-heated biscuit oven, one has a vivid impression of the service which gas renders to this important industry. What this service means to the general public can be realized when it is mentioned that one firm alone, Messrs. Keith and Blackman Company, Ltd., in collaboration with Messrs. Baker-Perkins, have already installed gas equipment for biscuit baking which has a fuel consumption of 1 million c.ft. of town gas per hour. Considering that these gas-fired ovens were only put on the market at the outbreak of the war, the progress which has been made is proof of two things—that we are entering on a "gas age," and that the excellent construction of the apparatus made by such firms as Messrs. Keith and Blackman is doing much to bring about this millennium. The stand of Messrs. Baker-Perkins is of such interest that we propose to describe the oven in some detail.



"Baker-Keith" Gas-Heated Travelling Biscuit Oven.

The photograph illustrates the oven, which is 40 ft. in length, and is typical of hundreds of gas-fired biscuit ovens in use to-day in this country. The oven chamber is built of steel, with a cavity between the inner and outer sheets. This cavity is filled with non-conducting material, to minimize radiation losses. The baking chamber is heated by a double set of burners, part of these being arranged under the travelling chains of the oven, and part above the food. The oven has many attractive features. The heat can be controlled in every part of the oven; each burner is separately controlled, and a change-over can be made from one class of biscuit to another, which may require entirely different conditions and temperatures, in a few minutes. The oven can be brought up from cold to baking heat in an hour, and re-heated each morning in about half-an-hour. No solid fuel is brought into or through the factory, and there is consequently an entire absence of dust. The system of pressure gauges fitted to the oven enables the foreman to reproduce any given baking condition at any time and within a few minutes. The space occupied by the oven is far less than that required for the brick oven heated with solid fuel, and the prevention of loss by radiation gives much better conditions for the operatives. The construction of the oven is such that it can be placed on an ordinary floor, no special foundations or chimney being necessary. On account of the ease with which the temperature can be raised or lowered, it is possible between one day and the next to make any examination required in any part of the oven. Access to the baking chamber is arranged from the underside; doors being placed at convenient points along the whole length of the chamber. Complete combustion of the gas, which is supplied under pressure, is obtained under all conditions.

The oven at the Exhibition is being worked in succession by such well-known firms as Messrs. Huntley and Palmers, Peek Frean & Co., and W. & R. Jacob & Co.; and approximately 2½ tons of biscuits are being produced per day, without in any way taxing the capacity of the machinery available for the production or the baking of these biscuits. It can truthfully be said that the introduction of the gas-fired oven has revolutionized the production of biscuits and bread in this country and throughout the Empire.

### Some Films.

The Port of London authority announce the opening of their pavilion in the Palace of Engineering. Among its attractions will be what is described as the most wonderful industrial film ever taken, illustrating the activities of the Port of London. Aeroplanes were employed to take parts of this film.

There are, of course, other films to be seen in the Exhibition dealing with particular matters. Among these may be mentioned the cinematograph display of the General Electric Company. There is a film display three times daily, and they seem to be much appreciated. In this way the public are made acquainted with many activities of this big organization. The complete series of pictures available would take four hours to show.

### The General Electric Company.

Reference was made in our Special Number to the excellent exhibit of the General Electric Company, Ltd. Their pavilion covers an area of some 5000 sq.ft.—the major portion being arranged in two storeys, on the upper of which is the cinematograph room mentioned in the preceding paragraph. Shortly put, the idea aimed at in planning the display has been to demonstrate the ability of the "G.E.C." to undertake everything connected with the generation, distribution, and application of electricity. On the ground floor will be found the electric power station, goods-handling yard, and a complete model electric shop. On this floor also are an electric kitchen, main hall, reception lounge and inquiry bureau, and an illuminated rock garden. The upper floor is reached by a staircase, and also by an electric lift. On this floor are the sitting room, a large hall for the display of lighting fittings and methods of illumination, and the conference and cinema room.

The section devoted to the heavier engineering side of the Company's activities has been laid out primarily with a view to showing plant representative of the generation, transmission, and application of electricity. In order to achieve this end, plant embodying the most modern practice in each of these main divisions of the industry has been erected so as to let visitors see as nearly as possible, subject to the confinement of a stand, an electricity generating station, a transmission line with the necessary control and protective apparatus, and motors with control gear such as are used in the more important industries.

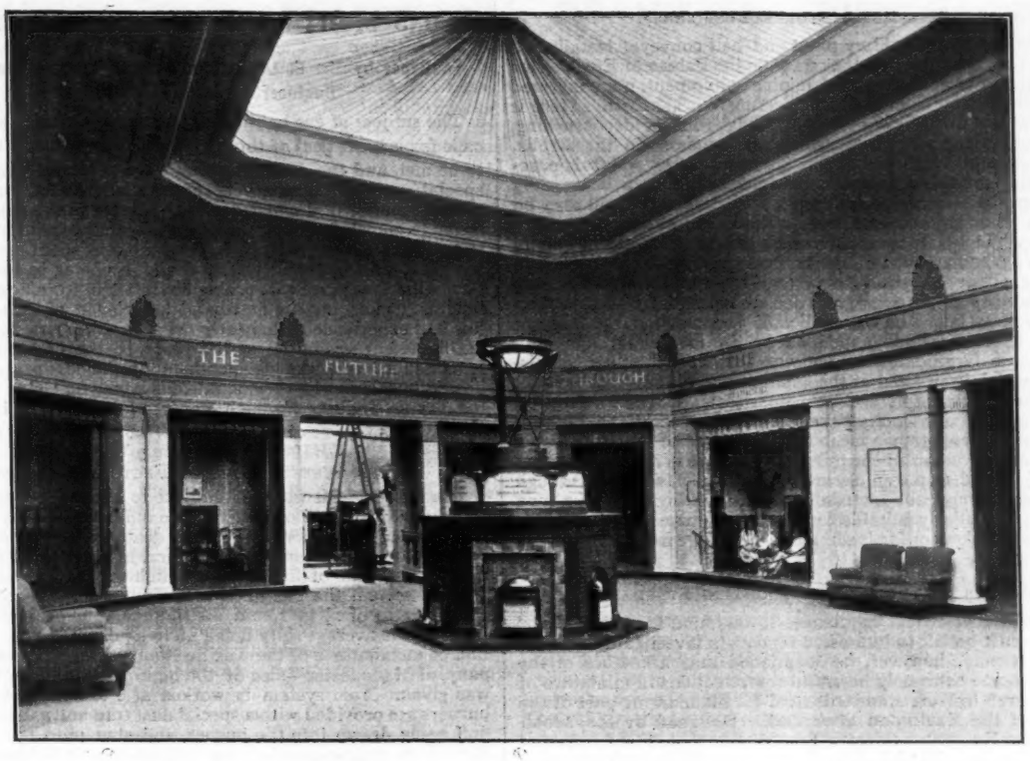
Heavy engineering is also represented by conveyor plant and a model electric winding engine, which serve to illustrate certain classes of manufacture undertaken by the Fraser and Chalmers Engineering Works of the "G.E.C."

### An Electric Winding Engine.

The one-eighth scale working model of a Fraser and Chalmers electric winding engine represents an engine driven through gears by an 800-h.p. 230-volt "A.C." motor, with a cylindro-conical drum 12 ft. to 16 ft. in diameter, capable of lifting 5 tons of coal from 1500 ft. in 58 seconds. The model is driven by a small motor fitted in the base, but is complete in all its working parts, with a Whitmore overwinder and driver's cabin. The full-size Whitmore overwinder is worthy of inspection. It can be used in conjunction either with a steam or an "A.C." electric winding engine.

### Robins System of Belt Conveyors.

Those who had the good fortune to attend the lecture on "The Mechanical Handling of Materials," with special reference to the Robins system, which Mr. F. H. F. Hampton recently delivered before the London and Southern District Junior Gas Association, will be particularly interested in the belt conveying plant installed by the Fraser and Chalmers Engineering Works (Proprietors, the General Electric Company, Ltd.), by which it is intended to illustrate in miniature some of the special features of the Robins system of belt conveyors. The plant consists of conveyors working in conjunction with a storage hopper and belt feeding apparatus. The design of feed for delivering the material from one belt to another is strictly in accordance with the Company's standard practice, and demonstrates the correct feeding of the material on to the belt, which is essential to good belt service. There is also incorporated the special arrangement of tandem drive which is used on large belt conveyors. The feeding apparatus under the storage hopper is of the Company's latest type of displacement feeder, which ensures freedom from shock



[*Photo. by Campbell Gray.*

**A VIEW OF THE REST LOUNGE, SHOWING THE MODEL ROOMS.**

at the bottom of the hopper, and delivers the material easily and without shock to the belt. As the material has to be used over and over again, it is impracticable to use anything in the nature of coal or coke, which would ultimately be ground to powder. A substitute has therefore been adopted, to illustrate the operation of the apparatus.

Owing to the expensive nature of the average conveyor lay-out, it is impracticable to do more than reproduce in miniature some of the above salient features. The operation of the miniature plant is as follows: Nos. 1 and 2 conveyors are first started up, and the shaking feeder next put into operation. The material from the hopper begins to feed at the tail end of No. 1 conveyor in a continuous and even stream. The material is then conveyed to the head end of No. 1 conveyor and delivered to No. 2 conveyor through a system of correctly designed shoots, and thence back to the storage hopper.

### A Huge Magnet.

Attention may be drawn to the "Witton-Kramer" electric hoist and magnet. The magnet has a diameter of 66 in., and is the largest of the type yet constructed. It is capable of raising a solid block of about 20 tons, and is shown in operation, lifting scrap metal and depositing it in a pit. An interesting device close by is a small magnet for holding up during riveting.

[*Photo. by Campbell Gray.*

**ANOTHER VIEW OF THE REST LOUNGE.**

### The Bettington Pulverizer.

In addition to the colliery plant and belt conveyor installed at the "G.E.C." pavilion, another stand in the Palace of Engineering is devoted to various items of mining equipment manufactured at the Fraser and Chalmers Engineering Works, Erith. Here is shown a standard belt-driven crushing roll for dry crushing, capable of giving a product of medium fineness. In these rolls, which are totally enclosed, a new type of bearing which is practically dust-proof is employed. Another exhibit is a heavy-duty two-stamp battery of special design. On this stand will also be found a Hardinge conical mill, suitable for either wet or dry crushing. This mill operates on the principle of a multiplicity of grinding bodies rotated in a conical drum. These bodies, in dropping, crush and grind the material passing through the mill. The cone ensures proper segregation of both the grinding bodies and the material to be crushed, and keeps the large balls or pebbles used as grinding media near the feed end of the mill, which has a large diameter, and the smaller balls near the discharge, which is situated at the small-diameter end.

Other exhibits in this section comprise a "Gayco" separator, working on the air-velocity principle, and designed to enable very fine material down to 300 mesh to be separated. There is also a Bettington pulverizer of the unit type, capable of pulverizing coal up to 1½ in. and 10 p.ct. moisture so that 85 p.ct. will pass through a 200 mesh screen, and a model of a single-roll crusher of a type which is particularly suitable for crushing mine coal for use with chain-grate stokers or for feeding to a Hardinge mill or Bettington pulverizer.

### Models of the Ground Lighting Standards.

The general electrical appliances to be found in the "G.E.C." pavilion must be left to interested readers to investigate for themselves. It may, however, be mentioned that a feature of the exhibit is some extremely beautiful reproductions in miniature of the "Sphere" lighting standards used for illuminating part of the grounds of the Exhibition after dark. Designed by the Architects to the Exhibition (Messrs. John W. Simpson, F.R.I.B.A., and Maxwell Ayrton, F.R.I.B.A.), 500 of these special fittings have been manufactured and supplied by the "G.E.C." The reproductions referred to are made in spelter, heavily gilt, and are on sale in the "G.E.C." pavilion as a memento of the Exhibition.

### Technical Books on Sale.

We are asked to state that Messrs. S. Rentell & Co., Ltd., have a stand in Avenue 15, Bay 14, in the electrical section of the Palace of Engineering, where they have on sale a very large assortment of technical books, covering a number of the principal trades of the country—such as cotton spinning, textiles, papermaking, engineering, building construction, locomotives, motor cars, industrial chemistry, wireless telegraphy, and the industrial crafts generally. Inspection is most cordially invited, and catalogues will be willingly supplied.

### Lion Postage Stamps.

Attention is called to the fact that the new Wembley Lion postage stamps are on sale at the Exhibition Post Offices, and that the purchase of these stamps by exhibitors and visitors will help much to circulate the fame of the Exhibition.

## SCOTTISH JUNIOR GAS ASSOCIATION.

On Saturday, May 3, an enthusiastic party of about 40 members of the Eastern District, paid a visit of inspection to the Aitken Colliery and Power Station, Kelty. Small parties under the guidance of officials were conducted round various shops at the pithead, and subsequently made an inspection underground. They were conducted to the coal face, where they had an opportunity of seeing the latest type of coal-cutting plant. The Aitken Colliery—the original shaft of which was sunk in 1895—is considered one of the best equipped in the country, and with the addition of the new shaft has an output of over 2000 tons of coal per day. The Electric Power Station, with an output of over 10,000 kw. per day, proved of considerable interest to the members, much attention being devoted to the extensions in course of construction.

After the visit, Messrs. The Fife Coal Company, Ltd., entertained the members to tea in Cowdenbeath, when Mr. M'Neil, on behalf of the Company, expressed pleasure at seeing such an enthusiastic turn-out, and said that they hoped what the Juniors had seen that day had been of interest and instruction.

Mr. D. D. Bruce (East Wemyss), President of the Association, returned thanks to the Company for the privilege they had enjoyed, and said that their visit had given them a new conception of the difficulties to be overcome before coal reached the gas-works. Mr. Reis, Manager of the Colliery, associated himself with his Chairman's remarks, and at the same time emphasized their policy of endeavouring to supply only clean coal.

Mr. Rule, Manager of the Kelty Gas-Works, was heartily thanked for inviting members to visit the gas-works during the forenoon. A very enjoyable and instructive afternoon and evening were then brought to a close.

## GAS LIGHTING IN THE TEXTILE TRADE.

**[A Paper by Mr. E. L. Oughton read before the Illuminating Engineering Society on April 28.]**

The subject of gas lighting in the textile industry is one which calls for a great deal of thought, for the conditions which have to be met, and the difficulties that have to be overcome, are of a special nature. It was very appropriate—indeed, necessary—that the author of a paper dealing with this problem should have intimate knowledge of the average working conditions obtaining in textile factories. Mr. E. L. Oughton has spent many years in the heart of the textile industry, and, by being in constant contact with the practical problems relative to efficient factory lighting, has acquired a first-hand knowledge of this work. He has had experience with nearly every type of gas lighting, from flat-flame burners in the earlier years, to the high-pressure systems and the modern development of the low-pressure superheated burners. In view of this, his paper on "Gas Lighting in the Textile Industry," which was read before the Illuminating Engineering Society, at the Royal Society of Arts, on April 28, is of considerable interest.

### Different Systems of Factory Lighting.

The author dealt with his subject in three sections. First of all he gave a résumé of some of the different systems which had come under his observation. After dealing with the low and high pressure upright incandescent burner, he went on to discuss the "Selas" system of high-pressure lighting by inverted burners. In this system the gas and air are mixed in a machine in the air-gas ratio of 1½ to 1, and distributed at a pressure of 10-in. (water); the average duty being 40 to 45 c.p. per c.ft. A description of installations of the Textile Illuminating Engineering Company, of Manchester—also of the high-pressure inverted type—was given. This system is worked at 6 to 8 in. pressure. The burners are provided with a special dust trap and gauze to prevent fluff being drawn into the burner, and give 40 to 45 c.p. per c.ft. Should the compressor fail, the burners remain lighted at a lower efficiency. Many mills are using the "Keith" 54 in. and 81 in. inverted high-pressure burners. These range in candle-power from 60 to 500, and have a useful duty of 45 to 50 c.p. per c.ft. In the "Selas-Turner" "whole-mixture" system, the gas and air are mixed at 10 in. water column, so as to form a self-burning mixture. No air is taken in at the burners, and provision is made to prevent any flashing back. The gas consumption of a 100 c.p. burner is 2 c.ft. per hour. The advantages of this system are that the burner is unaffected by dust or fluff, and the lights may be lowered without difficulty, while the absence of gauzes eliminates the major maintenance charges.

High efficiency in gas lighting, said the author, was not limited to high-pressure systems, for great advances had been made in low-pressure burners and lamps. The latest system was that developed by Messrs. W. Sugg & Co., Ltd., in which the gas and air mixture was preheated in a superheating chamber. This system gave a duty, under working conditions, of 40 to 50 c.p. per c.ft., with a pressure of 2½ in. The great strides made in low-pressure lighting pointed to the increasing need of discrimination as to which system should be installed. There were instances where high pressure should be used; yet, with the prevailing keen competition, initial cost, maintenance, and running charges had to be considered seriously.

### General Considerations.

What may be termed the second section of the paper was devoted to general considerations. Textile mill lighting, it was stated, should be arranged to allow for a minimum general lighting as distinct from the local lighting of the machines, and should be separately controlled on each floor or in each room. Where high-pressure gas other than the 6 to 8 in. "Textile" systems was used, it was advisable to have a number of low-pressure units in each room directly connected to a separate supply, so as to avoid panic and accidents in the event of failure of the high-pressure supply. The lighting units should not be arranged on rule-of-thumb methods, because illuminating science had demonstrated that scientific lighting could reduce actual lighting costs, increase the health and comfort of the operative, and minimize the number of preventible accidents.

Where good daylight illumination is provided, the hours of artificial lighting are lessened, but the artificial illumination should be such that the diversity between daylight and artificial lighting is not too great. Many mills need artificial light almost throughout the year. This state of affairs causes the workers to be satisfied with an illumination which is too low for a high standard of work, and which is bad for the eyesight.

### Causes of Unsatisfactory Illumination.

There are six main causes of unsatisfactory illumination. An obvious cause is the provision of too few or too weak light sources. Antiquated methods of lighting are also a source of dissatisfaction. These, however, are rapidly dying out, for, though some employers may be indifferent to the workers' welfare, the competition at home and abroad demands maximum output and a high standard of work; and to obtain this, adequate illumination is a necessity. Gas undertakings realize that indifferent lighting in factories inevitably reacts on their own business, so that gas-lighting installations are now inspected, and modern systems advocated. Two other causes of trouble are inadequate supply

and neglect of upkeep. These also are now of rare occurrence, and are indefensible, for gas undertakings generally have a specially trained staff for this work, which they undertake at low cost. Finally, trouble is caused by inside obstruction, and by the careless placing of the lights. This can be remedied by re-planning the installation; and if the primary laws of illuminating engineering are observed, shadows may be eliminated, whether due to the obstruction of the machines or to faulty spacing of the lighting units.

REFLECTION COEFFICIENTS OF DIFFERENT MATERIALS.

The standard of minimum illumination in mills working on materials with different coefficients of reflection should always be based on that giving the lowest reflection. This was emphasized during the war period, when the author had greatly to increase the illumination in several mills where previously light-coloured goods were made, because of their new work in the spinning and weaving of dark grey and black materials. In some cases the illumination had to be more than doubled. An example of the importance of taking into account the coefficient of reflection is given in the 1915 Report of the Home Office Departmental Committee on Factory Lighting: Grey cloth having a coefficient of 20 p.ct. is illuminated to 5 foot-candles. Its surface brightness would be matched by a perfectly white surface illuminated to 1 foot-candle.

In the final section of the paper the author dealt in detail with the illumination required for the various processes in the textile industry. In turn, he discussed the processes of dyeing, scribbling, mule spinning, winding and warping, weaving, perching and mending, scouring and milling, tentering, cropping, brushing, moser raising, blowing, and pressing. Slides showing the need for taking into consideration the colour factor were thrown on the screen. Others illustrated the complicated machinery in use in textile mills; and the necessity for illuminating these adequately, from the points of view of the worker's safety and a good standard of work, was fully realized.

**Discussion.**

Mr. L. GASTER, who occupied the chair, said that the paper presented by Mr. Oughton was most instructive, and would act as a guide when the lighting of textile factories was further considered. It certainly had proved to the Society what gas could do. Many people did not appreciate the importance of the coefficient of reflection, which had been stressed—and rightly so—by the lecturer, who had suggested that a minimum standard of illumination should be decided upon. Theoretically there was nothing to say against this proposal; but in practice the minimum standard would tend to become the maximum one for the "slacker." Consultations with the authorities would yield better results than would any one standard. The latest code in America proved the truth of this statement, and showed that their former anxiety to fix standards had not been attended by unqualified success. All they now recommended was a minimum permissible general illumination, suggestions for good practice, and advisable production intensities. Many people were employed in the textile industries, and this paper, based on a long and wide experience, was of interest and value.

Mr. J. G. CLARK, of the Gas Light and Coke Company, remarked that Mr. Oughton had not mentioned the question of the surface brightness of light sources. It was always advantageous to reduce the brightness of an intense source; and a figure of 10 candles per sq. in. was a satisfactory one. The proper maintenance of gas-lighting installations was, of course, an important matter; and all large users should place this in the hands of those who knew what was required—in other words, it should be left to the gas undertaking. No allusion had been made to distance control, for which there were many applications in mills. It allowed light sources to be placed at a greater height. Mr. Oughton had mentioned the need for preventing the choking-up of burner nozzles by small particles of dust and fibres of material, but had made no reference to the "Keith" system in which air for the burner was drawn from outside the building. This system enabled one to employ smaller sources of light. That higher illumination was required for dark material was a practical necessity. The lecturer had suggested that illumination should be based on the darkest materials worked, but if this were done, the contrast when a change to light material was made would be enormous. This situation called for a lamp the candle-power of which could be varied.

Mr. OUGHTON admitted that the surface brightness of the high-pressure lamp was rather high. With regard to distance control, this had been employed extensively in general lighting schemes. The lights over looms, &c., however, were individually controlled. Generally speaking, it was seldom that a textile mill was subject to much change in the colour of the materials worked.

The CHAIRMAN moved a vote of thanks to Mr. Oughton, after which he announced that the next meeting would be held on May 20, when a paper on "Some Problems in the Daylight Lighting of Textile Factories" would be read by Mr. P. J. Waldram.

## An Efficient Baffler for Geysers.

How many geyser troubles would disappear if only each appliance was fitted with an efficient baffler! Times without number irritation and impatience result solely from down-draught. Why, suggest Messrs. Bostel Brothers, Ltd., of No. 37, West Street, Brighton, should this dissatisfaction be allowed to exist when an efficient and, moreover, inexpensive remedy is at hand? Down-draught, they claim, is completely mastered by the "Woolgar" baffler; and judging from the host of testimonials of real value, there is no reason to doubt this statement. Apparatus which is simply constructed is usually the most efficient; and this applies to the "Woolgar," which in its design embodies the result of careful thought and practical experience extending over many years.

## THE "NEW WORLD JUNIOR" GAS-COOKER.

**The Minimum of Wearing Parts, for Hiring-Out Purposes.**

"LET us set ourselves an ideal—a goal—to which to work in realizing a cooker which shall be in advance of all our previous efforts." We can imagine that something like this was the resolve of Radiation Ltd., before putting to work their technical staff—investigators and designers—upon what has come to be known far and wide as the "New World" cooker, the construction and main features of which are well within the cognizance of readers, together with the "Regulo" oven-heat controller. The other day the writer was with a constructional engineer who knows a great deal about big plant, but has not interested himself overmuch in gas-consuming appliances. The conversation turned on gas-cookers. In the course of it, he remarked that his wife had one of the first of the output of the "New World" type of cooker, and in her estimation the "Regulo" was one of the finest gas-cooking advances for housewife or cook she had ever come across, because it provided an infallible means of controlling the temperature of the oven. In fact, the words of the husband were: "She swears by it." Let that pass. It was independent testimony which, being within our knowledge, may be utilized.

However, the "New World" cooker is a high-class product. It is something which costs money; it is within the buying capacity of a great number of people, and a great number have desired possession, and have obtained it. But it is perhaps beyond the purchasing power of the multitude; it is not the production that gas undertakings can afford to let out at pre-war rates. One thing that in times past seemed ridiculously wrong was that the lower the price of a cooker, the more it receded from the standard of efficiency set by the more costly types. That great multitude of consumers who preferred to pay a rent for cookers, or those who wished a cooker to be their own property and could not pay the price of a high-grade one, and so had to be content with one of more moderate value, were to be pitied. Yet these are the people whose aggregate cooking consumption transcends enormously that of the fewer and more wealthy people. But they cannot afford to pay so much for service rendered. To them, therefore, a high cooker efficiency is of immense importance; notwithstanding there were times when they had to be content with the lower efficiency of the cheaper grades of cooker, or go without the convenience which was so largely recognized and realized that the gas-cookers in use to-day are counted by the million. Those times have passed. Exemplifying this is the "New World Junior" cooker. But why "Junior?" True its natal day was after that of the "New World." That is the only thing that justifies the title. Its price is lower than that of the "New World;" its efficiency is found to be practically equal to that of its predecessor; and for hiring-out purposes the fewness of parts, interchangeability, and therefore maintenance costs have been brought to a point which marks the present stage of ingenuity in this regard of those who have been responsible for searching for the ways and means by which these things could be accomplished to greater advantage. Thus it is the "Junior" can say to its predecessor: "I am your equal in certain respects, and for hiring-out purposes your superior, though I may not have such a striking appearance." But there will be no quarrel between the two. They both have their spheres. What, however, we are glad to find is that a type of stove suitable for hiring-out need not make those gas consumers who perforce have to hire the victims of a gross inefficiency. Cheapness, efficiency, and interchangeability—interchangeability extending in this case to the series of three sizes—are in the present day the primary desiderata of the gas-cooker, and those characteristics have formed a sort of tripartite ideal in designing and producing the "New World Junior."

FEWNESS OF PARTS FOR THE SERIES OF THREE SIZES.

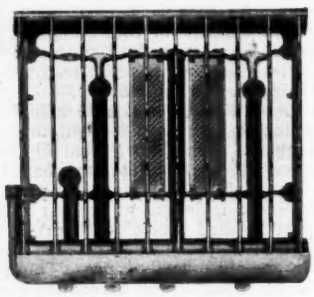
We are not going to suggest that the appearance of the "Junior" cooker is not good. It is. Good castings, workmanship, finish, and strength are at once commanding features. But in such a product of utility, the structural features which give good service for a moderate expenditure of fuel, and at the same time reduce to the minimum the number of parts which have to be stocked, and so diminish maintenance costs and labour, are the all-important features. The three sizes vary only in their width. Therefore, the only differences in them are the front frame and door, the back, and the crown plate; all other parts—the sides, the bridge, and the equipment of the hotplate are the same, and are therefore interchangeable in all three sizes. What in these respects are used on the largest size of cooker are as equally applicable to the small or the medium size one. This is a convenience and an economy in relation to quantity production, and to gas undertakings purchasing for hiring-out purposes.

THE HOTPLATE EQUIPMENT—ONLY FIVE PARTS.

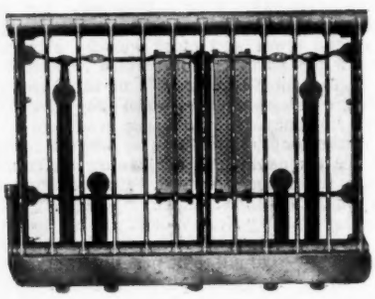
The body of the cooker, however, is not where the greatest wear and tear takes place. It is from the hotplate that the maximum service is sought and obtained. It is there that the wearing parts are situated; and these parts—standardized for all three sizes—have been reduced to five. There are only two lengths of boiling-burners, one grill burner, one grill fret, and one hotplate bar. If anything goes wrong with any one part, it is sufficient to know that it is a "New World Junior" cooker—no matter the size—to enable a man to go and make a renewal, and that without being accompanied by a bag of tools. The hotplates are all 18 in. in

depth; the widths in the three sizes are respectively 20 in., 22 in., and 24 in. On the 20-in. wide size, there is one grill burner and three boiling-burners, and the only difference from this in the equipment of the two larger sizes is that they have each four burners, instead of three. Provision is made so that, if desired, an extension piece can be attached at either end of the hotplate; thus securing additional serviceable area. The extension pieces are only supplied to order, and are extras; and this also applies to the plate-rack and white enamelled back plate, which enhance both usefulness and appearance.

The frame of the hotplate consists of two simple castings—one at the front, the other at the back—and one bridge (common to all three sizes), which form both the right and left sides of the hotplate. The hotplate bar has caused a fairly considerable expenditure of time in securing the proper shape. It is a single casting, and is so shaped as not to detract from, but rather to promote, a high thermal efficiency. It is reversible, and cannot be put in wrongly.



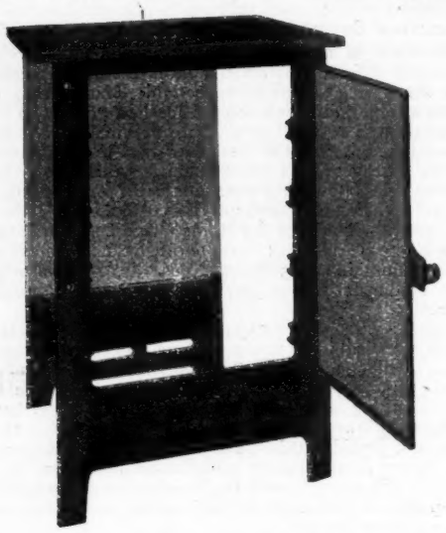
The Smallest Size of Hotplate.



The Largest Size of Hotplate.

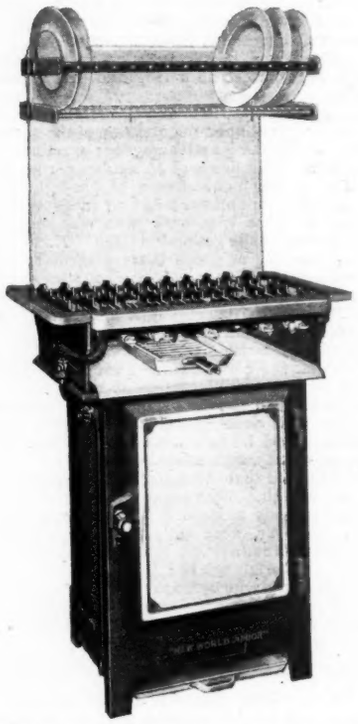
The Five Wearing Parts of the Hotplate.

The boiling-burners are on the principle of the "New World" "Rado" burner, but with four flames instead of eight. This difference has permitted single straight bars to be used, without intersecting the flame. The "Rado" burner, in fact, has contributed in no small degree to the simplification and minimizing of the number of parts, as it permits of full flame development in the space between the 2-in. unit bars. This is highly important. Then another demonstrated point is that the flames can be turned down, without lighting-back or being extinguished, to 1¼ c.ft. consumption per hour, which will keep ½ gallon of stew simmering at 180° Fahr. Another important feature in these days of declared calorific powers extending from 350 to 560 B.Th.U. is that the boiling and grill burners are fitted with an entirely new type of air-sleeve, which allows perfect adjustment under any calorific value conditions. The gas-taps have a cam-action adjustment, which produces (as also demonstrated) a perfect flame. There is no possibility of gas leakage; nothing to tighten up after regulation; and the burner can be cleaned without affecting the adjustment. The consumption of gas full on with each boiling-burner is 8000 B.Th.U. per hour, equivalent to 16 c.ft. per hour of gas having a calorific value of 500 B.Th.U. This is a considerable saving over old-type burners. The mentioned maximum thermal output is sufficient for all purposes, and is highly economical, when it is seen that the form of the flames is such that



A Specimen Cooker Body, showing the only Parts not Common.

the whole body of it is directed to active work on the bottom of the utensil above, and there is no waste through tails of flame "licking" up the sides of the utensil. The burner has been designed so as to avoid the breaking of the inner cone, and the promotion of poor combustion and unpleasant effects. The grill burner gives flames of uniform length, and can be rotated to serve as an extra boiling-burner. There are various other points about the hotplate which, like those already mentioned, are directed to securing the utmost working efficiency.



The "New World Junior" with "Regulo," Plate-Rack and Back-Plate, White Enamelled Door Panel, and Extension Pieces for Hotplate.

### The Oven.

The "Junior" oven is practically a reproduction of that of the "New World" cooker, with the "Regulo" automatic heat-controller. The inside depth of the oven of the three sizes is 13½ in., because, as previously explained, the difference in size is supplied in the width. The small size is 13 in. wide; the medium size, 14½ in.; and the large size, 16 in. As in the pre-

decessor, there is a single adjustable burner at the back of the oven; and the flue-outlet is at the bottom. Further points are that the enamelled side linings are embossed to carry the grids, and "gates" are dispensed with; also the thermal efficiency is practically equal to that of the "New World" oven. There is interest in the bottom placing of the flue-outlet. Through this the danger of explosion or of the flames smothering or being extinguished, as the result of an increase in the pressure of the gas, has been conclusively proved, by many experiments, to have been eliminated. Moreover, should an increased consumption of

The "New World Junior" showing Grids in Position.

gas occur, due to a rise in pressure, the products—if all unable to escape through the flue—pass out by safety vents. As all the cooking is done above the oven-flue outlet, the results are independent of external conditions. Only the air used for combustion passes into the cooking space. In the case of an excessive chimney pull, the extra air is drawn in below the cooking space. A further advantage that is submitted in respect of the bottom placing of the flue-outlet is that it eliminates all danger from the outlet becoming choked. The uniform heating which tests prove obtains in this type of oven, enables all cooking operations to be carried on in the bottom portion as well as at the top; thus there is no need to remove food from one grid to another. A small point, but nevertheless important, in view of juvenile inquisitiveness or playfulness, is that the gas-tap embodies a safety device against interference. As an extra, the door can be had with a white enamelled panel; but for hiring purposes, in our opinion, the black panel (though not so attractive as the white when new) has better wearing quality. One other assurance given is that the cost of these new cookers will enable hiring-out to be done at pre-war prices; and this with cookers of modern design and efficiency.

The "Regulo" Automatic Oven-Heat Controller.

THE "REGULO."

A few words about the "Regulo" oven heat-controller. This makes the "Junior" cooker (like the "New World") self-controlling. The device enables the temperature of the oven to be fixed at any point required for the preparation of food. It is only necessary to turn the graduated disc until the pointer is opposite the suitable mark to ensure that the oven is heated to the required extent, neither more nor less, and is maintained at that exact heat all the time. In from ten to fifteen minutes from lighting-up, the food is put in, and no further attention is needed till the end of the cooking period, when the food will be found correctly cooked—a second important consideration being that extravagant consumption of gas is avoided.

THE RENEWAL OF HOTPLATES.

Radiation Limited have produced a series of hotplates, incorporating all the improvements that have been described, for bringing up-to-date the hotplates of existing cookers, and giving to them modern efficiencies. These are valuable productions in view of the fact that the major part of the service of a cooker is by the hotplate. Not only is modern hotplate efficiency secured, but the cost of future maintenance is lowered by the facility supplied by the greater range of interchangeability. There is an immense amount of work to be done in this direction of cooker modernization; and it will have to be carried out in the interests of the gas business. When taken in hand, it should be well done.

## INSTITUTION OF PUBLIC LIGHTING ENGINEERS AND SUPERINTENDENTS.

At the meeting of the Council of the Institution held in London in February last, it was resolved to strengthen the Executive by the inclusion of the following to be members of the Council:

Mr. Walter Henry Chapman, Development Engineer, Metropolitan Electric Supply Company.
Mr. Ernest M. Severn, Public Lighting Supt., South Metropolitan Gas Company.
Mr. Robert Beveridge, Public Lighting Supt., City of Edinburgh.
Mr. Robert Davison, Public Lighting Supt., City of Newcastle-upon-Tyne.

These with the following existing members now constitute the Council:

Mr. S. B. Langlands, J.P. (Glasgow), President.
Mr. W. J. Liberty (City of London), Vice-President.
Mr. Thomas Wilkie, Public Lighting Supt., Leicester.
Mr. Robert Mason, Public Lighting Supt., Birmingham.
Mr. E. F. Spurrell, Borough Surveyor, Holborn Borough Council.
Mr. W. Chambers Smith, M.Inst.C.E.

The foregoing is evidence that the Institution is being built upon a broad basis, and speaks well for its future activities.

We have received from the Hon. Secretary (Mr. W. J. Liberty) some details of the proposed programme for the autumn conference in Glasgow, arrangements for which are being carried out by the President. The dates for the meeting are Tuesday and Wednesday, Sept. 16 and 17. On the Tuesday the members and delegates will be officially welcomed by the Corporation of Glasgow at the City Hall, and entertained at luncheon there. On the same day the President (Mr. Langlands) will give his Presidential Address, and papers on important subjects will be read on the 16th and 17th. On Thursday, the 18th, it is hoped to arrange a visit to Edinburgh. Further details will be issued later.

It is proposed to hold a Council Meeting in London on June 24.

Forms of application for membership can be obtained from the Hon. Secretary, Mr. W. J. Liberty, City of London Public Lighting Supt., Guildhall, E.C.

### Benzole Wash-Oil.

In "Das Gas- und Wasserfach" for March 29, A. Thau, of Deuben, advocated the advantages, as a wash-oil for benzole extraction, of light oils from brown-coal distillation. The use of the ordinary heavy oils from bituminous coal, he stated, has various disadvantages. If it is not renewed in good time—and for this 50 p.ct. of the quantity in use at one time is needed yearly—the efficiency is greatly impaired, and the heat required for the distillation, owing to emulsification, upsets the economy of the whole process. The brown-coal oil proposed is about equal in price; it absorbs more efficiently; it shows a very clean separation from water; it does not thicken; and it does not take into solution any impurities that may be present in the gas. Any water can be easily drawn off at the bottom of the container, and other impurities removed from it from time to time without difficulty. It requires no renewing or regeneration, and is therefore, over a long period, considerably cheaper than the heavy oil. In the complete absence of water, there is a very appreciable saving in steam consumption in the distillation process, so that in the long run benzole recovery can be made much more profitable.

### The Paris Visit.

Six weeks to-morrow (on June 26) those who will have the good fortune to be able to extend "Institution Week" to include the week-end and participation in the Paris celebrations leave London by the afternoon "Continental" from Victoria. The April 20 number of the "Journal des Usines à Gaz" again sets out the provisional programme which will mark the hundredth year of gas in France and the Jubilee of the Société Technique. The programme is in the main known to our readers, but a few additional points are given here. We note that the Jardin d'Acclimatation, buildings in which will house the Exhibition and provide a hall for the meetings, is in the Bois de Boulogne; and special transport will be provided to convey members and visitors thereto. After Thursday's late arrival, 11 a.m. has been fixed as the hour at which the English visitors will lay a wreath on the tomb of the Unknown Soldier at the Arc de Triomphe. That night the official banquet will be given; and on Saturday the hosts will be the Société du Gaz de Paris—which corresponds to our Gas Light and Coke Company—at the International Gas Exhibition. A short conference will precede an official visit at 10.30 by M. Millerand, President of the Republic. In the early evening there will be a reception by the Municipality at the Hôtel de Ville. Sunday's excursion to Douai and St. Quentin will include an inspection of a "dry" gasholder, which is certain to arouse great interest. The Douai Town Hall will be the rendezvous for a luncheon given by the Société Saint-Quentinoise d'Eclairage. Afterwards there will be a visit to a works reconstructed after devastation. It is hoped to reach Paris again at 8.30 p.m., as a start will have to be made at 10 a.m. from the Nord Station on Monday.

# EASTERN COUNTIES GAS MANAGERS' ASSOCIATION.

## HALF-YEARLY MEETING AT GORLESTON-ON-SEA.

Nothing was wanting to make a complete success of the spring meeting of the Association, which was held last Wednesday at Gorleston-on-Sea, under the Presidency of Mr. E. F. Keable, Engineer, Manager, and Secretary of the Gorleston and Southtown Gas Company. The warmest of welcomes and every possible consideration for their comfort ensured an enjoyable as well as a profitable time for the gratifying muster of members assembled to do honour to their President.

Meeting at the Gorleston and Southtown Gas-Works, the members were welcomed by Mr. C. S. Orde, J.P. (the Chairman), who, with Mr. P. Martin and Mr. H. T. Greenacre, J.P. (Directors), was genuinely delighted to make personal acquaintance with the members of an Association who had conferred upon Mr. Keable the highest honour they have it in their power to bestow. Mr. Orde spent a great part of the day with the visitors, which meant much to so busy a man—for in addition to being Chairman of the Gorleston and Southtown Gas Company, he occupies a similar position in connection with the Great Yarmouth and the Lowestoft Gas Companies and with Messrs. Grout & Co., Ltd. The assembly complete, Mr. Keable explained, with the aid of a plan, the layout of the site, and an inspection of the works was then carried through, under the guidance of the President and the Assistant Works Manager (Mr. W. Poll). The Company, who have been in existence just over seventy years, would seem to be in an excellent condition—seeing that in 1921 it became necessary to raise further capital, consequent upon the fact that in the four years preceding the output of gas had increased by 54 p.ct.

### On the Works.

Some interesting relics of the war, exhibited at the entrance, formed a suitable introduction to what the visitors were to learn regarding war-time experiences on the works. In May, 1916, in response to the urgent call of the Director-General of Explosive Supplies, the Directors accepted a scheme prepared by Mr. Keable, and installed at the Company's expense a complete plant for the recovery of material for the manufacture of "T.N.T." This plant was erected largely of materials at hand, by the Company's own staff, and was worked until after the cessation of hostilities, yielding a quantity of material that compared favourably with the amount produced by larger works in the country. In many respects this plant was unique, and the Directors threw the works open to the inspection of gas engineers, many of whom took advantage of the facility offered for examining the installation. As a matter of fact, the Company were among the first to engage in this special work.

The Company's property was hit and damaged during the first Zeppelin raid over this country on Jan. 19, 1915, and on the morning of April 25, 1916, suffered considerable further damage during the bombardment. On this occasion the works received about fourteen hits, of which two were suffered by the gasholders, firing the gas. Fortunately, no lives were lost, nor were any persons injured. For courage and high example in assisting to right the serious position caused by the two blazing holders, Mr. Poll was awarded by the King the Medal of the Order of the British Empire.

The works, which are situated on the west bank of the River Yare, receive their coal by sea, in vessels of about 400 tons capacity, discharge being by hand. The position is equally advantageous for the handling of all bye-products, the works being on the main road, and about a mile from the railway station. There are six beds of six horizontal retorts, 21 in. by 15 in. and 10 ft. long, with five regenerator furnaces and one generator furnace. Charging is by a Biggs-Wall "Rapid" manual machine; and the coke is drawn by hand. On the foul main there is a Parkinson retort-house governor above the beds, and an Everitt tar extractor on the inlet to the condensers. There are two sets of Bryan Donkin exhausters, each of 30,000 c.ft. per hour capacity; a blower being run in conjunction with them to provide air for purification. A Hunt washer of the bubbling type is at present worked with a very light seal, being undersized; and there is a Kirkham, Hulett, and Chandler vertical centrifugal washer of a capacity of 300,000 c.ft. per day. Two purifying boxes are by Robert Dempster, and four by Cockey.

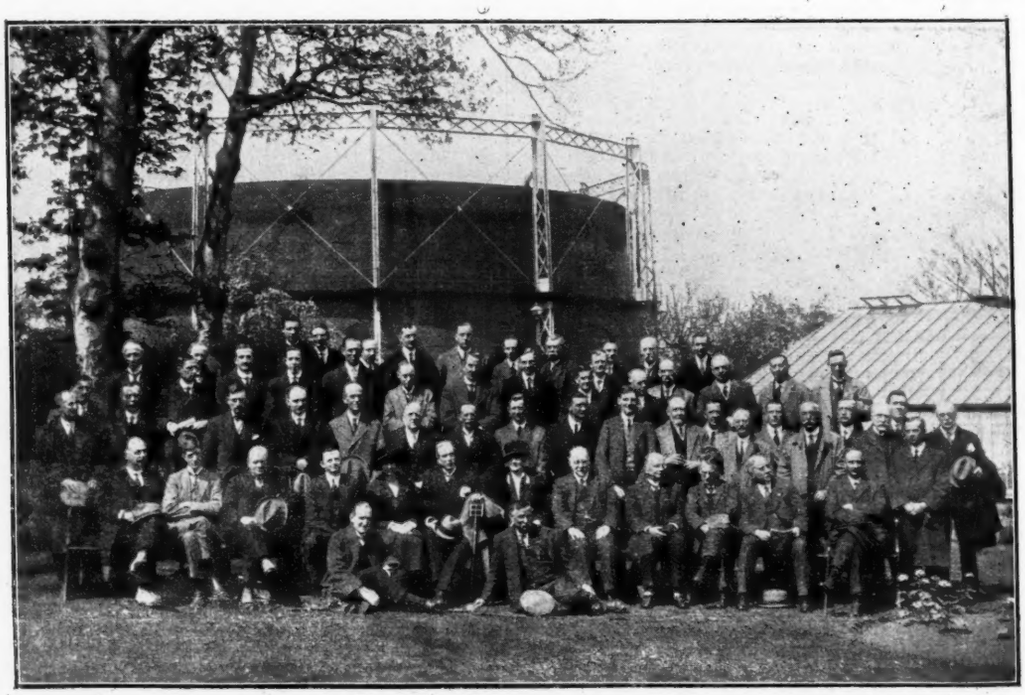
The water-gas set is of the "K. and A." type, with special operating gear. The capacity is 250,000 c.ft. a day, and it is equipped for lightly carburetting. Gas from the 60,000 c.ft. relief holder is measured, and then raised in temperature by the pipe twice traversing the length of the retort bench, in contact with the brickwork near the main flue. It afterwards mixes with the coal gas at the outlet of the retort-house governor, after which it has to travel through 98 ft. of 12-in. pipe running through the boiler, pump, and exhauster houses, before reaching the inlet of the tar extractor.

The coal gas and water gas meters are of the "Rotary" type. The mixed-gas storage holder, of 200,000 c.ft. capacity, is in a steel tank, standing on a concrete raft and piles. The holder inlets and outlets are situated in one building. For each district there is a Parkinson water-loaded district governor. In addition to two Cornish type boilers, fitted with Wilton's forced-draught furnaces, there is a Kirke waste-heat boiler connected to the retort-bench main flue, and also a Kirke gas-fired boiler as a stand-by. The tar, liquor, and water pumps are mostly by Joseph Evans. A Hird-Chambers tar plant is of 3 tons a day capacity. The sulphate plant is an early type by Cutler; a Taylor saturator has been installed more recently.

From an Ingersoll-Rand compressor, gas passes into a 5-in. welded steel main and a 2-in. screwed main at 5 lbs. per sq.in. The total length of these mains is 3496 yards. The gas is lowered to 35·10ths pressure by reducing governors on the district.

### Luncheon.

Members and their friends, on leaving the works, were taken by motor coach to the highest point in Gorleston, overlooking



THE EASTERN COUNTIES ASSOCIATION AT GORLESTON.

the sea, and here, in the Cliff Hotel (in the comfortable lounge of which some of them had foregathered on the previous evening), they were, to the number of about seventy, the guests of the Chairman and Directors of the Gas Company at an excellent luncheon. Mr. C. S. ORDE was in the chair, and two fellow-Directors, Messrs. P. Martin and H. T. Greenacre, supported him. Local guests included the Deputy-Mayor (Councillor E. J. Middleton, J.P.), the Town Clerk (Mr. W. Edgar Stephens, O.B.E.), the Borough Engineer (Mr. Sidney P. Thompson, Assoc.M.Inst.C.E.), and two Directors of the Great Yarmouth Gas Company (Messrs. A. P. Rising and Spencer Arnold). Mr. W. M. Mason, of the "B.C.G.A.," was also present. The Loyal Toast having been honoured,

The CHAIRMAN said he regretted that the Mayor was unable to be present. He had, however, appointed a deputy, and could not have chosen a better one.

Councillor E. J. MIDDLETON (Deputy-Mayor) said it was very delightful to be with them that day, and to have the opportunity of welcoming the Association to this loyal and ancient borough. The Association was formed in 1888, and so had been in existence no less than 36 years, and the present visit was the third paid to the borough in this period. But although this was the third time they had been to the borough, it was the first time the Association had met at Gorleston. The welcome which they, as a Municipality and as citizens, extended to the members was a very cordial one. They trusted that the meeting would be profitable, and that they would all return home benefited in every way, and that the communities they served would as a result get even better gas than they did at the present time. He might tell them that Yarmouth was one of the oldest boroughs in the United Kingdom; its first charter having been granted by King John.

Mr. FRANK PRENTICE (Ipswich) proposed a vote of thanks to the Chairman and Directors of the Gorleston and Southtown Gas Company, coupling with it the names of the Chairman and the other two Directors present—Messrs. Martin and Greenacre. The members appreciated highly the opportunity of visiting the Company's excellent works, and the magnificent hospitality of which they had been the recipients.

The CHAIRMAN, in response, remarked that he would also be meeting the visitors on the following morning at the works of the Great Yarmouth Gas Company, and subsequently at the factory of Messrs. Grout & Co., Ltd., and he was looking forward to the pleasure. It was certainly a great pleasure to see the Association there, and he had much enjoyed being with them. On arrival at the works, he had been struck by the big placard which was prominently exhibited bearing the word "Welcome." This was a very good idea on the part of the President, but he could assure them that good ideas from Mr. Keable were not at all infrequent. For this and other good reasons, he was not at all surprised that the Association should have this year chosen him as their President. Of course, it was an appointment specially gratifying to his Directors. They had all along recognized his great zeal, energy, ability, and intense devotion to work, as well as his steadfastness through the difficult years of the war. As a matter of fact, he had during that period special difficulties to contend with owing to the situation of the works. A recital of what Mr. Keable had done for the benefit of the industry as a whole would make abundantly clear why he had been chosen for the post of honour in the Association. This was his "coming of age" at Gorleston, as he was now in his twenty-first year of service with the Company there. He came to them, after having had a certain amount of commercial education, in the year 1903. In 1906 he was appointed Assistant Engineer, in 1915 Engineer and Manager, and in 1919 Secretary also. In the period from 1903 to 1914 the works were re-modelled, and during this time Mr. Keable acted as Draughtsman and Clerk of Works. In 1916, by request of the Ministry of Munitions, he wrote an article and a paper on the question of benzole recovery, which were subsequently reprinted and distributed as a booklet. A further paper on the same subject was written by him at the request of the Ministry in the next year; and this was followed by a number of other practical literary contributions which must have been of benefit to the industry. There was in particular an article by him in "A Thousand-and-One Uses for Gas," on "Gas for Heating Plates and Angle Irons Used in Ship Construction Work," which was favourably commented upon by the leading shipbuilding papers of the country. [Applause.] It was a highly creditable record; and he was sure they would all join with him in wishing Mr. Keable long life, health, and happiness to continue his useful career. He would ask another Director of the Company also to say a few words.

Mr. GREENACRE said the Chairman had replied so well to the vote which had been accorded that it seemed hardly necessary for him to add anything. It afforded the Directors the greatest possible pleasure to entertain so useful a body of men as the gas managers of that part of England. Personally, he was connected with the Corporation of Great Yarmouth, as well as being a Director of the Gas Company; and the Yarmouth Corporation owned an electricity works. He did think that these two undertakings could go very well together, and that there need not be between them any bitter antagonism. Each ought to be content to work in its own special sphere. Electricity had its uses for illuminating purposes, but even in connection with the lighting world, he might mention that recently the Corporation Lighting Committee had put a new installation of gas in one of their schools. This was perhaps due to the fact that gas afforded some heat, which was extremely useful in a large school. For outside lighting also gas could hold its own with electricity. While advocating no bitter antagonism, he realized, of course, that there should be business competition between the two. The gas industry supplied a real want to the community, and performed a service which the community very much appreciated.

The PRESIDENT said it was with extreme pleasure that he rose to address them on what was probably a unique occasion; for he was speaking as President of the Association in the town of his birth. He had never gone far afield, but had tried to do his duty standing by the borough which he loved. He had to thank the Chairman and Directors of the Company for their entertainment that day, and the Chairman for all the kind things he had said about him.

## THE BUSINESS MEETING.

The business meeting was held in the Pavilion—the PRESIDENT in the chair.

### CONFIRMATION OF MINUTES.

The PRESIDENT said the first item on the agenda was the confirmation of the minutes. These had been published in the Technical Press, and in accordance with custom would be taken as read.

Their confirmation was agreed to.

### REGRET FOR ABSENCE.

The HON. SECRETARY (Mr. W. H. Mainwaring, of Lincoln) intimated the receipt of several apologies for absence. He wished to mention one particularly. Mr. Canning, of Southend, who had intended being present, was unfortunately detained at home through illness.

### NEW MEMBERS.

On the proposition of the PRESIDENT, seconded by Mr. J. W. AUCHTERLONIE (Cambridge), the following new members were elected: Messrs. T. W. Dodds, Horncastle; A. J. Falkner, Dunmow; F. Wilkinson, Hunstanton; F. Young, Skegness; V. E. Harston, Norwich; W. Surman, Braintree; F. Allen, Newark; and F. Edwards, Wivenhoe.

### ANNUAL REPORT AND ACCOUNTS.

The PRESIDENT remarked that the annual report and balance-sheet had been circulated among the members, and he would straightway move their adoption, including a recommendation that five guineas be handed as a donation to the benevolent fund of the Institution of Gas Engineers.

Mr. P. D. WALMSLEY (Great Yarmouth) seconded the resolution, which was agreed to.

Mr. E. F. KEABLE then proceeded to deliver the following

## PRESIDENTIAL ADDRESS.

At the outset permit me to express to you my sincere thanks for the honour you have conferred upon me in electing me your President. This position of necessity carries with it considerable responsibility; but I have already been assured of your kind support, and such an atmosphere will go far in enabling me to put forward my best endeavours in the occupation of the Chair, and I hope in some degree to continue to merit your confidence. My thanks are also due to my Directors, not only for making it possible for me to accept this position, but for having invited you to meet in this ancient borough, the town of my birth.

In these days it is a difficult task to choose suitable matter for a presidential address, but I trust the majority will find something of service in what I have to say. I have been called upon to cope with a rapidly expanding output. Considerable alterations and additions to the works were rendered necessary from 1919, for during that year every available piece of the manufacturing plant was at work. Some of these additions I have already referred to in the papers you have given me the privilege of reading before the Association, and I do not purpose taking up your time in again alluding to subjects contained therein. My address will therefore confine itself more especially to the great question of service to consumers as it affects us at the present time and under existing conditions.

### DISTRICT RECONSTRUCTION.

Having completed the necessary extensions at the works, it was decided to tackle the urgent reconstruction of distribution in general. I had a census taken of existing conditions as far as they applied to mains, services, meters, and appliances; and after tabulating the results, I am bound to confess that they make bad reading. However, having gone to the root, or, in other words, brought to light what was largely unseen, it was evident that the demand had outgrown the vehicles of supply. This will be understood when I state that from 1892 to 1919 our output increased by 322 p.ct., 54 p.ct. of which was from 1915 to 1919. Our district in shape somewhat resembles a dumb-bell, the greatest demand being at the extreme ends. The total area is about 5 miles long by half-a-mile wide. It was decided to lay some new form of trunk main system, for, during the visiting season especially, the cooking peak loads had for several years been a serious problem.

### NEW MAIN.

Having regard to the high cost of materials and labour, it was agreed to lay a 5-in. high-pressure wrapped steel main with welded joints, tested to stand 100 lbs. pressure per sq. in. The expanding nature of the district made it necessary to lay this main to a large extent in virgin ground, leaving *en route* suitable branches with valves placed to act as feeding points when required. The complete scheme was satisfactorily carried out by Messrs. Gas Distribution, Ltd., to our requirements. The total length of the main is 3056 yards, and at two points (one being at the extreme end) gas is admitted to the low-pressure main through reducing governors. The principal set is in duplicate; and the Reynolds governors are housed in a brick pit situated under the public footpath. The main is not tapped at any other points. Not only has this main to make up the serious deficiency which previously existed at all meal hours, but has also to cater for the future needs of a large area already ripe for building development, as the Town Planning Act for the Borough of Great Yarmouth operates almost entirely in our area of supply. The total

area of our district is 2523 acres, of which 1662 remain to be built upon, representing space for approximately 19,000 properties in the future.

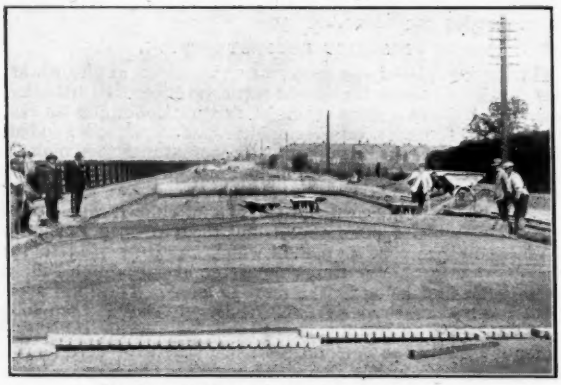
### COMPRESSING PLANT.

The compressor house was built adjoining the exhauster house, to avoid extra labour costs; and in the layout space is left for a duplicate set. The compressor is of the Ingersoll-Rand enclosed type, steam driven, single stage, with simple steam cylinder having piston valve and single water-jacketed gas cylinder. The steam cylinder is 9 in. in diameter and the stroke 8 in. The gas cylinder is also of the same dimensions. When operating at a speed of 300 r.p.m., it has a piston displacement of 173 c.ft. of free gas per minute, and is capable of compressing up to a final discharge pressure of 65 to 100 lbs. per sq. in., with steam pressure of 80 to 120 lbs. per sq. in. The receiver was constructed from a boiler shell 20 ft. in length by 4 ft. 4 in. in diameter, and is mounted on brick piers. The outlet is connected to a 4-in. high-pressure works governor, capable of dealing with gas up to 100 lbs. pressure on the inlet, and reducing to anything from 1 lb. upwards on the outlet. The set is provided with by-pass valve, and a by-pass is also fixed to the inlet connections to the receiver, and this at times is used to convey holder pressure to the district *via* the high-pressure main.

The compressor has a patent cut-out valve operating on the main steam supply, and can be set to cut out at any desired pressure, thus making it possible, with the aid of forced-feed lubrication, &c., for compressing to proceed for long intervals without attention. At the outset, the inlet of the compressor was coupled to a 15-in. main between the gasholder outlet and the inlet to the low-pressure station governors; but as this caused a slight oscillation on the low-pressure main close to the works, it was reconnected to a chamber which forms the common outlet of the holders before branching into the 15-in. pipe. Until a larger high-pressure main can be laid to the Southtown end of the district, a 2-in. screwed pipe about ¼ mile in length is conveying high-pressure gas to a point just beyond the first serious pluck on the Southdown low-pressure main, at which point is fixed a reducing governor in a brick pit.

### MODERN ROAD CONSTRUCTION.

The rapid growth of heavy motor transport has entirely altered the previous outlook on mainlaying problems. In laying my plans for the new 5-in. steel main, I was aware that the Corporation had in mind a new first-class by-pass road to meet the conditions named. As no definite plans of this proposal were then available, extreme care and foresight were needed to avoid such a proposal clashing with the new main. This task was, however, made easier by the fact that our relations with the Corporation officials concerned have always been of a happy and friendly nature. This new highway, which is 50 ft. wide, is considered the finest in East Anglia; and I hope to have the pleasure of taking you over its entire length of about 2500 yards. The foundation consists of concrete, 6 in. thick, reinforced with No. 9 "B.R.C." fabric, and, by way of trial, is covered in stretches with different asphalt material. The photographs of the road during construction have been kindly lent by the Borough Engineer, Mr. S. P. Thompson, A.M.Inst.C.E. The work was carried out as a



The New By-Pass Road under Construction.

relief job, by 200 men, in a little over six months, under the able direction of the Borough Engineer. The kerbs are of concrete, and the footpaths are of the same material 3 in. thick by 4 ft. 6 in. wide, with grass on each side. I am happy to state that, though our main was laid three years before, no alterations on our part were necessary. Bearing in mind the materials of which the road is composed, we may congratulate ourselves upon the fact that we were first in the field.

While on this subject, I think it is well for us as an industry to watch modern movements of this nature very carefully, especially where new roads, or those about to be reconstructed, depart from the beaten track, for it is obvious that such work may in some cases entirely alter existing distribution schemes at vital points. As an industry, we welcome progress; but, having sunk our capital to meet the needs of the public, any expense made necessary for the benefit of the community at large should most certainly fall upon the national or civic authorities. To this end we should throw in our whole weight, in common with other public utility authorities, to assist the National Gas Council in watching our vital interests in this all important matter.

This, and many other modern forms of road construction, will make it necessary for us in future to lay our mains under public paths, as, apart from the cost of breaking up and reinstating high-class road surfaces, such work is always a source of annoyance and regret to the public—to say nothing of the danger due to possible vibration or subsidence under present-day conditions. In the scheme under review, we have made provision for the main on either side under the footpath; and at certain points where large extensions are anticipated the mains are laid at considerable depth across the road, with ends capped to allow of linking-up in future. Over a considerable distance the road traversed an older part of the district. Apart from the recently-laid high-pressure main, we have running through this portion an 8 in. Mannesmann low-pressure steel main laid in 1911, to which about 148 services

"The Finest in East Anglia."

are connected. During the rapid progress of the work, these had to be examined. This gave me the opportunity of gauging the effect of twelve years' service upon a steel main, and the special form of protection which I had assisted in evolving seventeen years ago, in collaboration with my late chief. No repairs of any kind were necessary. The main, wrapping, and coating were in first-class condition. Leakage has always been a bugbear with us, due in part to the nature of soil in some portions of our district, but chiefly to the fact that in summer our streets are watered with sea water.

Some seventeen years ago we decided to lay all fresh services and renewals with steam tubing in a wooden trough filled with a protective composition consisting of 2 parts of pitch, 1 of tar, and a small amount of pit sand, which we mix ourselves. I submit a section of a service so laid for your inspection. Many services which have been down for seventeen years are externally as good to-day as when laid. In all, more than one-half of the entire number have been laid or renewed in this way. Having suitably laid our mains and services under modern roads (where they cannot be relaid under paths), and protected them from exterior corrosion, our problem thereafter will be to keep both from the ravages of interior corrosion. This subject has been fully dealt with by one of the Research Committees of the Institution of Gas Engineers; and their findings will need to be acted upon. However, trouble in services will crop up at times, especially from naphthalene; and it is important, for obvious reasons, that no risk should be run of totally blocking such services by the old method of trying to blow the deposit back into the main. To avoid this, we have brought into use an extractor in place of the usual force pump. Instead of forcing material back into the main, we draw the deposit into a container by means of a vacuum pump attached. This method has proved to us its great worth; and no doubt the good results obtained are due to the fact that the deposit is usually dry. All services which have been down for any length of time are more or less reduced in carrying capacity; and I see no reason why all such service pipes should not be drawn by this method, as in these days the full area is needed.

### EXAMINATION OF THE STEEL MAIN.

While the examination of the 8-in. Mannesmann low-pressure steel main (laid in 1911) was in progress, we had a section removed to test the effect of twelve years' use. During the intervening years, gases of different qualities had been carried; and I am sure it will be of interest to you to hear that the gauge was identical with the main when laid, and, further, that it had the same tensile strength—*i.e.*, 35 to 40 tons per sq. in. It is only fair to say that the soil in which both this main and also our new 5 in. high-pressure main are laid is free from any corrosive elements, as proved by analysis, and should give a very long life to these mains.

### FUTURE USE OF STEEL MAINS.

Steel mains in the future must come rapidly to the front, for the extension of our business depends upon the safe transmission of our commodity. Again, if we are to retain to the full the liberties conferred upon us by the Gas Regulation Act (as far as manufacturing methods are concerned), we shall be obliged to

give fuller consideration to this vital subject. The danger arising from the use of cast-iron mains in roads over which heavy traffic passes, coupled with the risk of subsidence, especially in our large cities and towns, is illustrated in a striking manner by the photograph I have secured, showing the results of the recent explosion at Newington Causeway, due to subsidence in connection with the City and South London Railway.

Fear is the enemy of progress, and we must let the public know that "safety first" is our motto. As to cost, though the initial outlay of weldless steel is higher than for cast-iron or spun pipes, the final costs when laid are in favour of steel. It will be seen from the illustration that steel mains are being laid in place of the damaged cast-iron ones. Apart from the considerations enumerated, we are looking forward to a large increase in the use of gas for domestic and industrial heating, and this naturally calls for mains which will stand the increased pressures which will be needed. To-day, we think in terms of inches of water column; to-morrow, we hope the need will be in lbs. per sq. in. In any case, it is certain that pressure feeding mains will become necessary if all points of our districts are to be served with adequate supplies consistent with present-day requirements.

The question of the exterior protection of steel mains is one which I am sure we are closely watching, for all soils are by no means ideal. This question is at present engaging the attention of the makers, and I understand that the time is not far off when an effective protecting medium will be devised, procurable at a reasonable price.

### WELDED JOINTS.

These have now been in use in this country for about twelve years; and if the necessary skill is exercised in making the joints, using the correct standard soft-steel welding wire, free from any

A—Mannesmann Main, showing Small Number of Joints. B—Cast-Iron Main, showing the Large Number of Joints. C—Branch Welded-on.

slag or impurities that might cause pinholes, there is no reason why the weld should not be equal to all requirements. Any trouble that may arise can usually be traced to a lack of understanding on the part of the welder. The steel may be high or low in tensile strength and carbon. All the welder needs to know is which class he is handling. He should adjust his flame so that he can control the metal flow. One type of steel is as easily welded as another.

### METERS.

In common with most undertakings, we have suffered by having in use a large number of undersized meters. Nothing less than a 5-light or No. 2 Standard meter has been purchased for several years. Sound 3-light meters are converted to No. 2 Standard, and those capable of further service are oil-sprayed and painted while at the works.

### COOKING APPLIANCES.

In 1917 we obtained our first calorific power Order, due to the fact that we were engaged in the recovery of crude benzole for the Ministry of Munitions; and since that time all appliances on our district have been overhauled and adjusted to suit the changed conditions of supply. Further, since then, every new piece of apparatus has been fitted with gas and air adjusters, in order to give our consumers the best possible value for their money. Most cases of so-called bad gas are due almost entirely to faulty combustion; and in my opinion it is necessary for our fitting staffs to have the fullest possible advice and help on this most important subject. I fear that in all too many cases this matter is not given its proper value.

While dealing with cooking appliances, I venture to suggest that few of us are paying adequate attention to the education of consumers in the use of their cookers. It is on the cooking load that we must depend to a large extent. The appliances have become a costly item in our expenditure, and many of us boast of large numbers fixed; but, after all, it is consumption we are out for, and this can only be realized by efficient cookers in the hands of competent and contented consumers. All too often we wait until the condition is causing inconvenience, and unfortunately some consumers will continue to put up with such conditions to the detriment of all concerned. The recent policy adopted by some undertakings of discovering the inefficient users and putting them right is a good move. To those, like myself, who are in charge of undertakings of a small size, such an expense may for a time prove heavy. In order to make a start along these lines, I have recently adopted the following method: I select at random, as my time will permit, a few consumers weekly, to whom I send a letter stating that it will be my pleasure to call upon them at an early date, to chat over the question of their gas supply. No more need be sent out than one can see one's way clear to deal with, but I am certain that many discontented consumers will thus be discovered, and, I hope, converted to good advertisers. The time is not far off when it will pay many undertakings to deal with all cookers on the district by a card system, with a staff sufficient to cover the total number in a reasonable time. I would suggest that it could be accomplished by the aid of a specially constructed covered-in motor van, in which stocks of spare parts could be replenished from day to day, and in which minor bench repairs could be carried out. When we consider the growing importance of these appliances to our revenue, and the high cost of haphazard journeys often needing back calls, some such scheme is worth considering. I am aware that this, or any other form of maintenance, costs money; but, after all, we ought not to rest content until we are giving the highest possible service. It is true that it will have to be paid for in the price of gas; but surely a cheap gas and a poor service is far from cheap, and most consumers would rather pay an "all in" figure, which would enable them to use our commodity economically and in comfort, than have a cheaper gas and a constantly irritating service.

Mr. J. H. Brearley has written some valuable articles on the question of post-war maintenance requirements—to meet existing needs, before making large decreases in the price of gas. I feel certain that the closer this important matter is studied (having first obtained a full survey of our needs both for the present and for the immediate future) the more will the wisdom of his able advice be appreciated.

Sound progress can only be said to be real when we are retaining the maximum number of old and tried friends, and adding new ones largely upon the recommendation of those who are at present satisfied users.

### HEAT TREATMENT IN THE SHIPBUILDING INDUSTRY.

In 1918 I was asked to contribute an article for an issue of "A Thousand-and-One Uses for Gas," dealing with heat-treatment practice in the shipbuilding industry. I was able to record the work carried out at the shipyard of Messrs. Crabtree & Co., Ltd., Southtown, in making good the heavy loss to British shipping due to submarine attacks during the war. Two large gas-heated furnaces were installed. One was for heating angle irons for ships frames—these angles being 30 ft. long by 2 ft. wide by 2 ft. deep—and had a gas consumption of 2500 c.ft. per hour when working at full load. The other, for the heating of ships plates, was 12 ft. long by 6 ft. wide by 2 ft. 6 in. deep; the hourly gas consumption also being 2500 c.ft. Air under pressure of 20 in. water gauge was supplied from a blower. The service pipe to the two furnaces from the trunk gas-main is a 4-in. one of Mannesmann steel. The gas from the meter to the furnaces is fed by a 4-in. screwed pipe. The gas and air supplies to the furnaces are separately controlled, and the burners are specially designed to give at will either even heating throughout the length of the furnaces, or a reduced or increased heat at any desired point. This is a feature which cannot be obtained by any form of solid-fuel heating. For a period of nearly four years, the supply was maintained to the perfect satisfaction of the proprietors of this shipyard, and these furnaces were considered at the time to be among the largest in this country to be fired on town gas.

During the period 1918-21, fifteen Admiralty salvage tugs and cargo vessels were built. All the frames, plates, &c., for these passed through these furnaces. The tugs were of 1200 H.P., specially equipped for salvage work, and the cargo vessels were for freights of 450 tons. It was our pleasure to assist this progressive firm in equipping and running these furnaces, thereby proving the ready and efficient use of gas in the nation's hour of need. During the war our port was used as a submarine and minesweeping base, and we were called upon to supply consider-

able volumes of gas for the many operations in the repair, &c., of these vessels and the special appliances used by them. As you are perhaps aware, we were also a seaplane base. An important aircraft propeller blade factory was started early in the war, and gas from our mains was entirely used for the many and varied processes through which these propellers had to pass. So far, we are only on the verge of heat-treatment by gas, and the future holds for our industry an untold field when the use of gas is more fully appreciated by the industrial community. The British Empire Gas Exhibition at Wembley should go far in bringing before the whole Empire the place which gas can fill in the industrial programme.

### SHOWROOMS.

Not long ago, it was my pleasure to open a discussion upon modern showrooms; and but for the serious slump in the fishing, engineering, and shipbuilding industries of our borough, the entire scheme outlined by me would have been completed before now. However, lessons are learned out of most cases of adversity, if taken in the right spirit. While thus marking time, we launched out in all directions until the scheme I had laid before you could be put into operation, by pushing sales at the consumers' premises. As proof of what can be done in this direction, I am able to state that our gross takings in the distribution department (and this while selling prices have been declining), have increased, from 1921 to the end of last year, by 191 p.ct.

The views I expressed in the discussion referred to are stronger than ever, but it has been proved that this form of approach needs to go hand-in-hand with showroom efforts to gain full results. Our showroom windows need to be really alive, and the displays constantly changed, if we are to get consumers to pay us the compliment of frequent visits. The men who staff our showrooms must be technically equipped to the fullest degree, and be able to present information required in popular and homely fashion. Such members of our staffs should have a real love for their work, and a complete and sympathetic understanding of the domestic difficulties experienced by the lady of the house seeking help and guidance. When this is the rule, consumers will take the same delight in calling upon us as most do in their repeated visits to drapery or other similar establishments.

### ADVERTISING.

Every progressive business depends largely upon systematic advertising. The British Commercial Gas Association have played a large part in bringing this necessary service prominently before our industry. Many undertakings, if not in actual proximity, are perhaps served by one newspaper at least, common to all within the district. This opens up the considerable advantage to be derived by co-operative advertising on a larger scale. The Great Yarmouth Gas Company and ourselves have exploited this system with much gain, sharing the expense in proportion to our respective outputs. A reprint of the front page of one of our local papers on one occasion gives an example of such a scheme, and this was circulated at the time by the "B.C.G.A." Personally, I am of the firm opinion that all set advertising is of little value, and that if we want to grip the reader, thereby bringing home our object, it must be frequently changed, to the point, and, above all, straightforward and truthful.

### RE-ORGANIZING OFFICES, STORES, AND DISTRIBUTION DEPARTMENT.

In June, 1921, at our invitation, the British Commercial Gas Association made a complete survey of our distribution and offices departments, and gave a detailed report thereon. It was clear that (after giving frank and full credit for all that was efficient) there was room for re-organizing at many points.

Unlike most other systems, the one recommended by the "B.C.G.A." is the result of practical experience, the searching investigation of all other known systems, and the co-ordination of the best ideas, based upon sound principles, into a complete system which is sufficiently elastic to be suitable for adaptation to both large and small undertakings. The system deals with a complaint or order from its receipt to the posting of the cost to the revenue account. It is at present working satisfactorily in undertakings of sizes ranging from 35 millions with 2 fitters, to 4000 millions with 200 fitters. As stated above, it has been devised by the "B.C.G.A." for the benefit of our industry, and is increasing in usefulness, owing to the fact that, as the results obtained from all parts of the country are tabulated quarterly, the best method is frequently being brought to light, and circulated for the benefit of those working it. It is in this particular that, in my opinion, it surpasses all other fixed systems. These concrete results are always an incentive to both manager and staff to attain greater efficiency; in other words, it is ever alive, and, when used as intended, it is impossible to get into ruts, which are the curse of all true progress.

The objects are as follows:

(1) To reduce the clerical labour of the fitters and superintendent.
(2) To provide a better check upon workmen's time.
(3) To provide figures for easier supervision, especially in regard to unproductive time.
(4) To provide an accurate record of stock from week to week.
(5) To provide a more accurate record of each job, and the expenditure thereon.
(6) More accurately to allocate labour and materials to the statutory accounts.
(7) To permit of more detailed allocation for the manager's information, together with each section's proportion of establishment costs.

A completed job voucher provides an accurate history of the job, as follows: Origin of inquiry; fitter's daily report; fitter's time, and value of labour; materials issued and used, and value; particulars of meters fixed and/or removed; particulars of appliances fixed and/or removed; and summary of costs, divided as follows: Labour, appliances, materials, delivery, expenses, and on-cost.

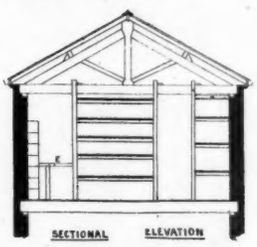
We have adopted the Association's card system for both ordinary and cash meters, to our great advantage; and, in addition to re-organizing the duties of office staff, we have completely re-modelled the stores department. Before giving details as to the stores, permit me to say that under the system the number of jobs per fitter per day has increased from 3·9 to 5·2—an increase of 33 p.ct. The system as a whole has considerably reduced the number of clerks and collectors necessary, and also materially reduced our costs for printing and stationery. When once understood, it is simple in working.

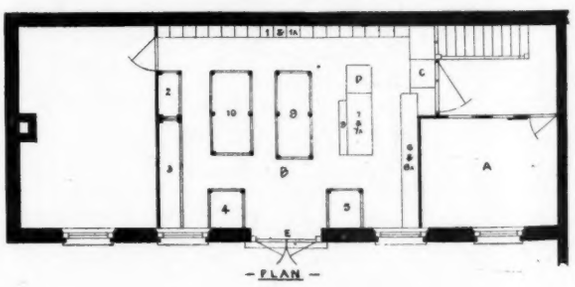
### STORES.

Previously our works and fittings stores were contained in several buildings, but as re-arranged they are now housed in one building of a capacity of 3933 c.ft. The entire stock is dealt with by the card system of the Association, and the detailed stock record is enhanced by the additional use made of the system, for ordering, estimating, and pricing. We are all anxious to keep down to the lowest extent capital as represented by stocks; and in this particular the scheme offers a ready solution by means of the maximum and minimum requirements always being before the buyer's eye. Further, a ready check is kept upon receipts, and issues of stores for works purposes, by means of a return we have adopted, which comes before me weekly. The stock records provide an authentic record of prices, both buying and selling, and also of quantities.

### DESCRIPTION OF STORES.

By the plan shown, you will see that the stores and control office occupy the first floor, this being the only suitable building available. It will be clear to all present that whenever possible the stores should be on ground floor.




**Plan of Stores.**

Upon referring to the plan, it will be noted that A is the control office, B the stores, C the serving counter, and D represents 24 lockers for fitters' materials ready to serve. Goods are brought to store level by a hoist operating at E. The racks are built up of 2 in. by 3 in. uprights with ¾ in. by 4 in. splines to form racks. A key plan has been prepared upon which the numbers of lockers and contents are shown. The sectional elevation shows the formation of the racks and lockers, and the walking spaces round same.

The stores as arranged furnish sufficient total space for works and district stores for 70 to 80 millions output. Briefly, the racks, drawers, and lockers contain the following, and are so marked on the plan:

(1) Iron service and steam screwed fittings (140 lockers).
(1A) Works stores (2 racks).
(2) Cookers, tins, grids, &c. (6 racks).
(3) Cooker parts (33 lockers).
(4 & 5) Compo pipe (6 racks each).
(6) Small brass fittings (70 drawers, some having two and four compartments).
(6A) Works engine-room stores (17 lockers and 3 racks).
(7) Pendants, brackets, &c. (2 closed cupboards).

(7A) Burner and gas-fire maintenance renewals (nest of eight drawers).
(8) Bolts, nuts, screws, and nails (nest of eight drawers and 18 lockers).
(9) Incandescent burners, mantles, and glassware (9 tiers).
(10) Meters and works stores (6 tiers).

It is impossible in the time at my disposal to give you further details, but it is a service to us (as an industry) which is proving of immense value; and to those who are dissatisfied with their present methods, I would strongly urge its adoption.

### RETURNS AND RECORDS.

We have brought into service with distinct advantage the use of a "Roneo" duplicating machine, by the aid of which we have been enabled to bring into being returns and records for the more efficient carrying-out of our work, on both works and district, which would not have been possible if the cost of printing had had to be faced. I have for your inspection a file of these forms. These fit readily into our scheme, as practically all our clerical work is upon the loose-leaf principle. Again, it offers more flexibility than could be possible if these were printed, because it is an easy matter to vary forms at will, as and when fresh ideas make it necessary. It is my practice personally to post these daily, weekly, or monthly records to a record book, which I keep for my own use, after which the forms are returned for re-use on back. This procedure keeps me in the closest possible touch with all departments, and those responsible to me up to the best standard. It has been a hard fight on a small works to get all concerned to comply; but, having got the scheme into good running order, I am more than compensated.

### CONCLUSION.

Without vision and lofty ideals, nations perish. So it is with industry or business. Surely no public service can wish for wider fields upon which to allow vision to have full play than our own. If the service we are giving to the community is real and full, we are striking upon the string which is nearest to the heart of most British people. I refer to that magic word "Home," and all that home comforts imply. The strain of present-day existence is telling its tale upon the wives and mothers of our land; and we hold the golden key which can unlock, to a large extent, resources which, rightly used, will relieve the drudgery and anxiety connected with the out-dated use of raw coal. The dirt and grime connected with the use of coal will not pass until our great industry, having been first gripped by the fair vision of a land over which a blue sky and beneficent sun holds full sway, presses forward with all its power, educating the people, and impressing upon the Government the necessity of such a state of well-being. Are we not stewards, holding in our hands one of the greatest gifts of God? It is our business to wrest from the coal we handle the sunlight of past ages at the cheapest possible price (consistent with a full and competent service), for the good of the many. While we keep such a vision before us, there is no need to fear for the future of the industry, which all present, I am sure, count it an honour to serve.

### A VOTE OF THANKS.

Mr. WALMSLEY rose with great pleasure to propose a hearty vote of thanks to the President for the able address to which they had just listened. The pleasure was the greater because, working in the same borough of Great Yarmouth, on the other side of the water, he knew, by personal contact in every-day experience, exactly what the President had done for the Company and what he was doing for the men under his charge. They must all have been much impressed with the very detailed manner in which the President went into his work of organization, especially on the distribution side. He always bore in mind—as they must all do—that it was no use taking trouble on the works over the manufacture of gas, if they could not sell their commodity and give satisfaction to the consumers. One thing that must strike one was the provision that had to be made in seaside places for main capacity to deal with the cooking load. They had had a vivid illustration of this in Mr. Canning's address at Southend a year ago, when they saw the immense quantities of gas sent out by the Company from 11 a.m. to 2 p.m. and from 5 to 7 in the evening. This made it essential that the distribution system in such places should be kept fully up to the mark.

Mr. AUCHTERLONIE said it was a great pleasure to second this vote. They all knew, of course, that Mr. Keable was a very ingenious and a very enterprising man, and were sure he would keep the members well primed with information. They had not been disappointed, and had been made to realize that he was thoroughly up-to-date in everything pertaining to gas manufacture and distribution. His extractor was quite novel. He (the speaker) did not know whether gasfitters could go about with this on a bicycle, but it could certainly be used for extracting naphthalene where this was at all troublesome.

The PRESIDENT expressed his obligation to the members for the kind way in which they had received his effort. The extractor was not made for general getting about, but when one considered the heavy cost of high-grade roads, it paid to spend a whole day over a job, rather than have to break up an expensive road surface. In a picture palace not long ago, a private company had installed piping of very small dimensions, and it became choked. It was at the back of some very costly plaster work, and they were able to clear the pipe without disturbing this plaster in any way. It was on such lines that the appliance was useful.

### RETORTING AND REFRACTORY MATERIALS.

Mr. VERNON E. HARSTON, of Norwich, then read a paper on this subject which, with a report of the subsequent discussion, will be published next week.

The PRESIDENT, in proposing a hearty vote of thanks to the author, expressed the hope that this might be by no means the last contribution the Association would receive from him.

The vote was heartily accorded.

### NEW OFFICE BEARERS.

The following office bearers were then elected.

*President.*—Mr. F. A. West, Newark-on-Trent.

*Vice-President.*—Mr. Frank Prentice, Ipswich.

*New Members of Committee.*—Mr. R. J. Calderwood, Spalding; and Mr. R. Wardell, Peterborough.

*Auditors.*—Mr. G. A. Mallett, Ipswich; and Mr. W. S. Venner, Brentwood.

*Hon. Secretary and Treasurer.*—Mr. W. H. Mainwaring, Lincoln

Mr. J. R. BRADSHAW (Retford), proposing Mr. West's election as President, said he was certain that gentleman would uphold the dignity of the Association in the manner they would expect from him. As a very close neighbour of Mr. West, he knew what a strenuous time he had gone through, and that he would have many interesting things to tell them.

Mr. R. G. SHADBOLT, in seconding, remarked that he had known Mr. West as a boy. He also knew both his father and his grandfather. He bore an honoured name in the industry, and one which would reflect great credit on the Association when he became President. He had shown himself to be a capable and practical gas engineer and manager, and this meant a great deal.

Mr. WEST suitably returned thanks.

Mr. THOMAS GLOVER (Norwich) moved that Mr. Frank Prentice be appointed Vice-President, saying that it must be very gratifying to every member of the Association that he had consented to fill this office.

Mr. F. M. PATERNOSTER (Felixstowe), who seconded, pointed out that he started his training under Mr. Prentice fully thirty years ago at Ipswich.

In connection with the re-election of the Hon. Secretary, some well-deserved compliments were paid to Mr. Mainwaring.

### PLACE OF NEXT MEETING.

It was agreed that London should be the place of the next meeting.

### REPRESENTATIVE ON THE INSTITUTION COUNCIL.

On the proposition of Mr. MAINWARING, seconded by Mr. AUCHTERLONIE, the President (Mr. Keable) was elected to represent the Association on the Council of the Institution of Gas Engineers.

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## ANNUAL DINNER.

The members and their guests re-assembled at the Cliff Hotel at 7 p.m., and some seventy-five in all sat down to the Association's annual dinner. The President was in the chair, and on his left Mr. F. A. West (Vice-President); and he was supported by Mr. P. Martin and Mr. H. T. Greenacre, Directors of the Gorleston and Southtown Gas Company. The guests of the evening were Councillor E. J. Middleton, J.P. (Deputy Mayor of the Borough), Mr. S. P. Thompson, Assoc.M.Inst.C.E. (Borough Engineer), and Mr. W. Edgar Stephens, O.B.E. (Town Clerk). Four Past-Presidents of the Association were there—Mr. R. G. Shadbolt (Past-President of the Institution of Gas Engineers), Mr. Thomas Glover, C.B.E., Mr. J. W. Auchterlonie, and Mr. H. R. Wimhurst. The arrangements left nothing to be desired, and the evening was unanimously voted a great success. The proceedings were punctuated by a well-chosen programme of music, the best-received items undoubtedly being those with which Mr. Robinson, of Walton-on-the-Naze, supplemented the professional talent. The following are points from the speeches which succeeded the Royal Toasts given by the President.

### "THE GORLESTON AND SOUTHTOWN GAS COMPANY."

Mr. THOMAS GLOVER, C.B.E., of Norwich, found it a great pleasure to propose this toast; indeed, they would be ungrateful if they had nothing nice to say after the treatment they had received from the Company that day. The Gorleston and Southtown Company had been in existence for 71 years, doing its duty in serving the historic borough with light, heat, and power. In the old days it was no doubt the service of light only, which was known as "the light without a wick." He was glad to see that a works of the comparatively small capacity of Gorleston could be so well equipped and efficiently managed, and was to be found applying itself so ably to the special needs of a seaside town. They could all realize what such a peak load in the summer meant to a works in respect of the provision which had to be made for it; and the Gorleston Company were to be congratulated on having met this extraordinary demand. Their good friend Mr. Martin, the Deputy-Chairman of the Company, was to respond to the toast. The name of Martin had been connected with the Company from the start; and they admired a man who had had the pluck to start such a concern in those days. In fact, the men of the gas industry admired all those who had gone before them, and carried on their jobs well without modern facilities—often with apparatus made by themselves. He was glad to recognize the continuity of the name in connection with the Company. He understood that the Gorleston Company worked amicably with the Local Authority, a point which he considered of great importance. It was right to magnify the aspect of public service in the gas industry—perhaps corporation-owned undertakings took this as a matter of course; but he was sure the "company" men looked on it in this light no less.

Mr. P. Martin (Deputy-Chairman of the Company) replied. It was true his name had a long connection with the Company; in fact, when as a boy, he was unwell, his parents used to give him a share in the undertaking. [Laughter.] The Company considered it a great honour that Mr. Keable should have been chosen as the Association's President. He (Mr. Martin) had had to give his opinion on Mr. Keable's appointment; and seeing him in his present position, he felt he had done right in his selection. They had been through difficult times together—Mr. Martin recalled the war and the benzole plant they had installed, and cited Lord Moulton's words about the country not being able to carry on the war without the gas industry. In that trying period they had at times gone to Mr. Glover at Norwich for advice, which had always been freely given; and they had been glad to reciprocate. There were great forces up against gas men; and it was only by being banded together, as they were in this Association, that they could overcome them.

"Success to the Eastern Counties Association."

Mr. Martin again was in charge of this important toast. He regretted that Mr. Orde was unable to be present; but their Chairman was also Chairman of the Yarmouth and the Lowestoft Gas Companies, and of Messrs. Grout & Co., and he had to conserve his energies. Personally he had had particular opportunities of meeting gas managers during the war, for he had acted as Secretary of the Gorleston Company during that period in place of his son who, out of six members of his family who went to the war, alone came back. In gas management there were three main things to consider: First, the public. In this direction the gas industry had come out supreme during the war; and Mr. Martin referred to the coal shortage, saying that ordinary business men would have shut down rather than lose money, whereas the gas industry nailed its flag to the mast and carried on. Secondly, their men. He considered they used to have a hard life; but in these times their comfort was studied—they had regular holidays, good wages, facilities in the way of clubs, and sport of every description. In their own case they always worked harmoniously together. They sought to raise the men's condition; but there was a point beyond which they could not go, for they could not raise the price of gas regardless. Their third consideration was the shareholders. There had been a good period of much-increased output, but this fell off during the time of bad fishing. Last year, however, they had had the best balance-sheet ever submitted. [Applause.]

The President, acknowledging the toast, said it was 19 years since he became a member of the Association, and he had seen ups and downs in it; but as he looked round at familar faces, it reminded him of the benefits they had been able to derive from the Association. The gas manager was usually the only one of his profession in a town, and in consequence he had no one with whom to discuss matters. Personally, as a matter of fact, he was in a unique position, as he had two other gas engineers (Mr. Walmsley, of Yarmouth, and Mr. Hawksley, of Lowestoft) living in the Borough, with whom he could consult. Normally, however, it was only by meeting together as now that they could further their knowledge. He thanked the visitors for the way in which they had received the toast.

"The County Borough of Great Yarmouth."

Mr. R. G. Shadbolt gave this toast, referring in the first place to the great antiquity of the County Borough, of which they had heard from the Deputy Mayor at luncheon. The fusion of Yarmouth and Gorleston into one borough had proved an eminently satisfactory bargain; and those present wished them every success. He reminded the company that fishing was not Yarmouth's only industry. Some might be surprised to hear that the port stood fifth in the list for timber importing. Again, there were considerable shipbuilding yards, which were held in excellent regard during the war; and on this there followed an engineering trade of marine character. Last, but not least, came the silk industry. With citizens like the Chairman of Messrs. Grout & Co. (who, as previously mentioned, was Chairman of no fewer than four companies) the Borough would continue to hold its own. Messrs. Grout's works were almost unique in that they carried out every process from the receipt of the raw material to the finishing of the goods; and those present would realize the size of the undertaking when he told them that the firm's employees numbered as many as those of a gas undertaking producing 200 million c.ft. a year. The County Borough catered, in addition, for every form of recreation and health recuperation; and they were to be congratulated on having such scope for their energies. Mr. Shadbolt mentioned the fact that the Electricity Undertaking of Yarmouth was owned by the Corporation; and he affirmed, on behalf of the Association and the gas industry generally, that they recognized there was room for both gas and electricity. The existence of a strong competition in business had perhaps more to do than anything with progress. As long as they could live and let live they could wish each other every success, which the Association certainly wished the County Borough of Great Yarmouth.

The Deputy Mayor (Councillor E. J. Middleton, J.P.) felt he must be careful in his reply to gas folk while the Town Clerk was present too. [Laughter.] After acknowledging that Yarmouth and Gorleston were of great assistance to one another, he proceeded to state some interesting facts relating to the development of the Borough. No enmity existed between the Corporation and the Gas Companies; competition had alternately brought both gas and electricity on, and he had no doubt they would both go on working to bring comfort into the homes. No one realized the value of a gas-ring better than himself; and in a seaside resort every facility should be given for cooking by gas. He was struck by the manner in which poor people had learned to use gas and save labour. "A prophet was not without honour save in his own country;" but Mr. Keable had taken the leading position in the concern to which he had gone as a boy. Mr. Keable saw all sides of a question when dealing with his employees; and he had stuck to his job through the lean time of the war and after. They were glad to think a better time was coming.

"The President."

Mr. F. A. West (President Elect), of Newark, proposed the health of their "valued friend." They had seen his efficient works, and recognized the way he had steered through troubled times. With the toast he wished to couple the name of Mrs. Keable, feeling sure that the inspiration and help the President received from her were considerable.

The President said he had been overwhelmed by their kindness all that day, which he would never forget. Most of all he was touched by the reference to his wife. He was proud to belong not only to the gas industry, but to the Borough, where he was born and educated. He was more than pleased that his old schoolmaster (Mr. Alfred Alpe, who shook hands with him, and afterwards spoke in eulogy of of his one-time pupil) was with them. To Mr. Alpe he owed much, including the instilling of his early ideas on chemistry. Mr. Keable confessed that what had been said in his honour that day would have but one effect—to make his efforts for the industry greater.

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## HOSPITALITY.

### The Great Yarmouth Company's Works.

A full programme had been arranged for the following day, when charabancs reported at the Cliff Hotel at 9.30 to convey members to the Yarmouth Works for a visit by invitation of the Directors of the Company and Mr. P. D. Walmsley, the Engineer and General Manager. The route taken led along the new road, with its varied experimental top dressings, described in the Presidential Address, and by the river, bordered by various factories and wharves, which gave an indication of the numerous industries mentioned by Mr. Shadbolt overnight. The cars arrived at the works in a storm of rain, and no time was lost in dividing up and commencing the inspection.

Interest was immediately roused in the mechanical workshop, which, with the smith's shop, men's messroom, lavatories, and works stores, is in a building near the entrance. Mr. Walmsley has the advantage of excellent machinery which was obtained at various Disposal Board sales, and enables all running repairs to be done at home. Moreover, all brass and small iron castings are made on the works and finished in this shop. A novelty was seen in the form of an electric drill, which can be supported and worked comfortably by one man. The motor is contained in the body of the tool, and current is taken through flex from any lighting point or plug. Many learnt something quite new in the fact that stainless steel is used for nearly all machine parts, valves, &c., which are likely to be exposed to water, as in Yarmouth, and the latter has been found to have a most deleterious and rapid effect on ordinary steel. The initial cost of this material was remarked upon; but Mr. Walmsley affirms that the first cost is the last. A neat design of valve for a pump was being turned out of stainless steel, but most interesting was the treatment of worn links from the Gibbons charger. Two or three inches of stainless steel are welded on to form the sole-plate of the still serviceable remainder of the link.

The carbonizing plant consists of five regenerative settings of six ⌂ retorts by Messrs. Gibbons, of Dudley. The retorts are of unusually large section—24½ in. by 18½ in.—but there is no trouble in getting a full retort with the Guest-Gibbons charger-discharger; and 1-ton charges are worked with 12-hour periods. These settings replaced 12 settings of small-section retorts. When the carbonizing plant was thus reconstructed (with the inclusion of 11-ft. furnaces and Meade grates) something drastic had to be done to the retort-house roof; and this was raised bodily 12 ft. and the necessary brickwork interposed—no mean engineering feat. Room exists for the contemplated addition of three settings. The building which houses the Humphreys and Glasgow water-gas plant was erected by the Company's staff. The plant is of 650,000 c.ft. capacity, and was installed in 1920; a carburettor being added last year.

As for residuals working, it may be mentioned that a complete tar-distillation plant is in operation, in which the Engineer hopes to be able to run to pitch with steam distillation only. Household ammonia and a disinfectant which has been given the name "Creofectant" are prepared on the works.

Full information may be found in the highly interesting paper entitled "Reconstruction at Great Yarmouth," which Mr. Walmsley read before the Association at last year's spring meeting [see "Journal," Vol. 162, pp. 285-90].

### The Great Yarmouth Showroom.

Next on the programme was a visit to the factory of Messrs. Grout & Co., Ltd.; but on the way a halt was made at the Great Yarmouth Company's Social Club in King Street, where the party were made welcome with refreshments. The Social Club premises adjoin the showroom and offices of the Company, which the writer was fortunate to be able to visit later in the day.

On entering the showroom, one is faced by the handsome staircase which leads to the boardroom and offices, while the eye is caught by a notice directing consumers who wish to settle accounts to the pay-desk which, according to the best practice, is at the gas end of the room. On the left is a show-case containing a variety of shades in glass and silk—some hand-painted—and beyond this a series of three "Eagle" and three "Eureka" gas-cookers by Messrs. John Wright. The "Eagle" cooker has a counterbalanced drop door to the oven. To the right of the counter is arranged a water-heating demonstration outfit; a bath being served from either a Wright "B.T.U." circulator, or a Davis "New Shamrock" geyser, and a lavatory basin from a Fletcher Russell "Celerity" heater. There is also a Davis "N.H." wash-house boiler on view. As much bright copper as possible

THE ALL-GAS KITCHEN AT ARNOLD'S.

has been used in the appliances and connections; and the demonstration is undoubtedly striking. A Wright "Sector" hot-closet and a "Frier" gas-heated fish and potato fryer remind one that there must be a considerable sale for such larger apparatus in a borough like Yarmouth. Near the door the Radiation "New World" and a Parkinson "N.G.C." standard cooker face one another. The upstairs suite of offices, which were constructed by the subdivision of a large room by breeze-concrete walls, oak-panelled, leaves nothing to be desired.

### MESSRS. GROUT'S HOSPITALITY.

A detailed description of the many highly interesting processes seen in the factory of Messrs. Grout & Co., Ltd., comes within neither our province nor our capacity. Opportunity was given to view every branch of the work carried out by the firm's thousand employees—sorting and preparation of the raw silk, spinning, weaving, and dyeing, inspection, and putting-up into the neat rolls familiar to the "shopping" public. Mr. F. J. Farrel, the Managing Director, was indefatigable in his explanations, and one wished that more than a small and stedfast group of fortunate ones could have heard what he said through the rattle of thousands of flying spools or shuttles.

Thence a move was made to Arnold's (the Harrods of Yarmouth), where about sixty took luncheon at the invitation of Messrs. Grout. Mr. Chas. S. Orde was in the chair; and with him were Mr. Farrel and others connected with the firm. The Deputy Mayor and the Town Clerk were again among the guests, and Mr. Arnold (a Director of the Great Yarmouth Gas Company). Speeches were few and to the point.

The PRESIDENT gave "Messrs. Grout and Company." The firm, he said, were established about 120 years ago, which fact perhaps provided one link with the gas industry. The name of Farrel stood out, in connection with silk, throughout the world. Mr. Farrel was Chairman of the Silk Association. Messrs. Grout already had a factory built in Canada—deriving their power from the Niagara Falls—and Mr. Farrel was shortly going over to set them to work. Mr. Keable sought for a connecting link between the silk and the gas industries, and found it in the dye mauve, and in the fact that sunlight was necessary to make a background for the silk industry's commodity, while the gas industry claimed to have done more than any other to clear the atmosphere and enhance that sunlight. The gas industry had also given the housewife more leisure to enjoy and show off their friends' products.

Mr. AUCHTERLONIE supported the toast; and Mr. ORDE replied, saying how thoroughly he had enjoyed being with the Association.

Mr. F. J. FARREL seconded his Chairman. Referring to Mr. Keable's remarks about the two industries, he considered that coal-tar derivatives were perhaps as essential as any other product of industry. He touched upon the advantages of members of an industry meeting together and with the representatives of other industries for the interchange of knowledge. Those present would be interested to learn that his firm had the first gas-works in Yarmouth, the chimney at the factory being a relic thereof. It was unfortunate that silk-working machinery at present had to come from other countries; but he hoped in time to be able to show them a factory equipped with English machinery. Messrs. Grout's factory had been working overtime for three years, and were turning labour away every day. He hoped the visitors would make a point of viewing the silk exhibits at the British Empire Exhibition, and would realize that this country could turn out silk goods as fine as any other country's product.

The PRESIDENT voiced the thanks of the Association to all concerned.

### AN ALL-GAS RESTAURANT KITCHEN.

A note on the luncheon menu was to the effect that gas was used conclusively for cooking at Messrs. Arnold's restaurant; and the visitors were kindly permitted to see the kitchen, a photograph of which Mr. Walmsley kindly procured for us.

The main cooking range comprises two ovens placed back to back, with a continuous enclosed hotplate. The over-all dimensions are 4 ft. 2 in. by 5 ft. 2 in. by 2 ft. 11 in. high. The ovens are double-cased and packed, and are fastened by top and bottom bolts actuated by a lever handle. All the oven fittings are removable. The hotplate has six double concentric ring burners, each ring being controlled by a separate tap; and there are removable rings and plugs over each burner. Soup and stock are dealt with in an "Atlas" gas boiling table with two 10 gallon copper boilers. Gas is supplied from a pipe in front of the appliance to two-ring burners, each ring under separate control. A "Cito" griller on stand is 60 in. wide by 26 in. deep by 22 in. high. Compartments therein are 24 in. by 21 in. by 12 in. high, and each has four separately controlled burners.

There is a two-oven "Vega" vegetable and pudding steamer, the steam in which is generated by three atmospheric burners. An automatic cistern supplies the water dish. The door has rubber joints and is fastened by a wheel and screw, and is provided with a channel for carrying away condensed moisture. The pans of a large fish and potato fryer have a water-lute arrangement which prevents grease getting to the burners and fumes escaping except by the flue. Six burners are supplied from a tap-rail in front. The hood has a draining rack.

A "Sector" hot-closet and carving table combination has luminous burners for the former purpose, and bunsens for the water chamber of the carving table. The latter has three carving recesses and three tureens, and is complete with overhead gear. A double toaster, 3 ft. by 12 in. by 15 in., has an automatic arrangement whereby the gas in a compartment is turned down when the shelf is drawn forward, and *vice versâ*. In addition to the foregoing, there is a "B.T.U." boiler, a "Jackson" tea and coffee boiler, egg poachers, &c. The whole of the equipment was supplied, through the Great Yarmouth Gas Company, by Messrs. John Wright and Co. (members of Radiation, Limited).

What a wonderfully complete gas equipment to come across suddenly, so to speak! We will leave to others a little sum in Rule-of-Three: If Messrs. Arnold's cater for 100 lunches and 250 teas with the above apparatus, what apparatus must Messrs. Lyons require to provide lunches, teas, and dinners for anything up to 100,000?

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**Manchester District Institution of Gas Engineers.**—The 198th quarterly meeting of the Institution will be held at Elland on Friday, May 30, under the Presidency of Mr. G. S. Frith, J.P., of Runcorn. There will be a visit to the Elland Gas-Works, to inspect the new installation of Dempster-Toogood vertical retorts. On the invitation of the Chairman and Directors of Messrs. Robert Dempster and Sons, Ltd., luncheon will be provided at the Constitutional Club, Elland, after which a visit will be paid to Messrs. Robert Dempster and Sons, Rose Mount Iron-Works, Elland, to view the various processes of gas-plant manufacture. By invitation of the firm, tea will afterwards be served at the Constitutional Club.

# LINKING-UP RURAL AREAS WITH A HIGH-PRESSURE GAS SUPPLY.

By JOHN E. MORFETT, of Sunderland.

**[A Paper read, on May 2, before the North of England Gas Managers' Association.]**

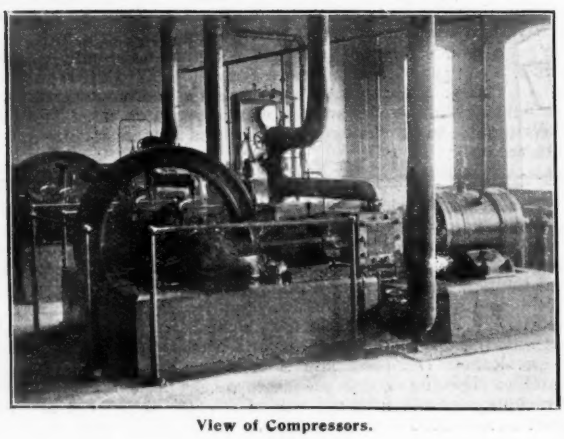
It is now generally admitted that the subject of the distribution of town gas has become one of paramount importance to all gas authorities. First of all there is the necessity of providing the consumer with an efficient supply of gas at a pressure and quality suitable for a small lighting burner, furnace, or engine. Second come the higher costs of labour and materials now prevailing, with which might be coupled the newer methods of road construction. The latter affects not only the cost of new main work, but the searching for leakages, and repairing work; and it seems to me that, where roads with concrete foundations and metal reinforcements are laid, every distribution department will have to possess the latest plant for dealing quickly with openings, especially in the case of leakages. These plants, though costly, may in some cases repay the outlay by the more expeditious reaching of the source of trouble in hard-topped roads.

Generally speaking, many branches of work come under the heading of "distribution." First of all ranks the distribution of gas at a pressure suitable for all requirements, and the fixing and maintenance of all apparatus on the district. Then there is the transport of men and material, the storing of the latter, the renovating of all returned appliances, the manufacture of apparatus to consumers' special requirements, the selection of suitable appliances for sale or hire, the lighting, extinguishing, cleaning, and maintenance of public street lamps, efficient showrooms and sales staff, and finally the office routine, with its systems of records and costing, &c. Then there is the natural absorption of the smaller companies by larger concerns. It is more in reference to this phase that I have chosen the subject of my paper.

In the Sunderland Gas Act, 1919 (to which the Royal Assent was given on July 22 of that year), among other measures then obtained was one extending the limits of supply. Up to 1919 the acreage of our area of supply was 7380. By this Act the area was increased to 19,875 acres. The necessary preliminaries of negotiation and purchase were successfully carried out. In this added area, three villages, each containing its own small gasworks, were chosen to be linked-up to one of our main works. Due consideration was given to the question of a low-pressure or a high-pressure supply to each village; and, taking into account the difficulty of crossing railway bridges with the larger pipes, and the sizes of the low-pressure pipes available, and consequent heavier outlay, high pressure was decided upon.

High-pressure systems may be divided into two classes—a medium high pressure with a large-diameter pipe, and a higher pressure with a small-diameter pipe. Allowing for all possible extensions at each village, the higher pressure with the small-diameter pipes was adopted. The three places chosen were Whitburn-by-the-Sea, Castletown, and South Hylton (or Ford, as it is sometimes called—due, I believe, to the fact that many years ago it was possible to cross the River Wear by foot near the village). Whitburn in the main is a good-class residential village, with a proportion of colliery workers. South Hylton is partly residential, but the villagers consist principally of shipyard and forge workers, and paper makers. Castletown is purely a colliery village. Whitburn is situated from the supply works in a north-easterly direction, South Hylton in practically a westerly direction, and Castletown, after crossing the River Wear, is also in a westerly direction. The population of each place is small, as follows: Whitburn 5291, South Hylton 3317, and Castletown 3202. The number of consumers at the time of taking-over (1919) was: Whitburn 222, South Hylton 411, and Castletown 89.

After deciding upon a high-pressure supply, we installed two sets of "Bryan-Donkin" compressors with Reynold's district governors. The compressors were fixed at the Ayre's Quay Works of the Company, in a building erected for the purpose and large enough more than to duplicate the plant, if found necessary. The choice fell upon these works owing to their favourable position relative to the new districts to be linked-up, saving approximately 3500 yards of mainlaying, and avoiding passing the busiest parts of the town, with the more expensive excavating and reinstating of roadways.



View of Compressors.

The compressors chosen are the horizontal steam-driven reciprocating duplex type, and each set is capable of passing 30,400 c.ft. of free gas per hour at 150 r.p.m. against 9 lbs. pressure. Their speed is controlled by a diaphragm steam regulator which is operated by the outlet pressures of the compressors, and adjusts the steam supply to the engines. A 6-in. excess-pressure valve is provided between the inlet and outlet main, so arranged that any pressure in the outlet above the required outlet pressure can be released into the inlet main. Thus the outlet pressure can be maintained constant. A loaded by-pass valve is also fitted between the inlet and outlet connections, allowing the by-passing of gas from the inlet to the outlet when necessary, should the inlet pressure be greater than the outlet, due to the compressors stopping.

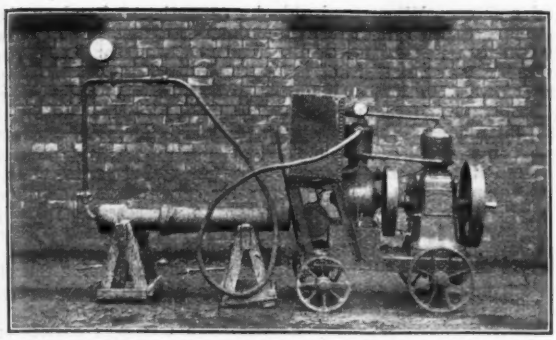
The tubes used for the high-pressure part of the scheme, which in each case was up to the district governors, were solid-drawn steel tubes made by the British Mannesmann Tube Company. Tubes of this description are undoubtedly, to my mind, the best of a small choice for this class of work. The tensile strength of these, as compared with cast-iron, eminently fits them for such work. The ease with which they can be bent is a proof of their elasticity, and they are practically immune from breakage, which is by no means the case with cast-iron pipes where subsidences due to colliery workings, such as we have in our district, are so numerous. Respecting the elasticity of tubes, the following photograph may be of interest. It shows a cast-iron main. Rough seas have washed away the subsoil, causing the pipe to form the curve shown, and without breaking.

Cast-Iron Main. Subsoil washed away by Sea.

The tensile strength of the tubes used is between 30 and 40 tons, and the tubes are as a rule tested to 600 lbs. per sq. in. They will stand much higher pressures than this; and in a series of tests we carried out with steel tubes, using lead wool as a jointing medium, we have reached as high as 1200 lbs. per sq. in. before joints showed any signs of weeping or drawing. The joint adopted was the one known as the rigid or sleeve joint. With the 3-in. tube, each spigot or plain end is driven into the sleeve a distance of 7 in., including faucet. With the 4-in., each spigot or plain end is driven into the sleeve a total of 8½ in., including faucet. With the 6-in., each spigot or plain end is driven into the sleeve a total of 10 in., including faucet. The tubes varied in length from 16 to 35 ft.

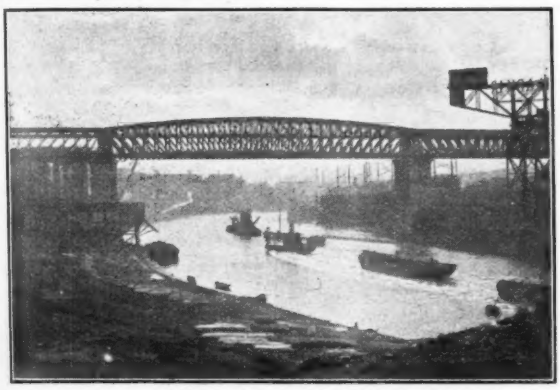
The weights of lead wool used per joint for the different sizes were as follows: 6 in., 4 lbs.; 4 in., 3½ lbs.; and 3 in., 2½ lbs. This is rather in excess of the lead-wool makers' recommendations. The lead is, in each case, preceded with white yarn; each joint throughout the scheme being tested to 50 lbs. per sq. in. The ever-reliable soap and water test was used at each joint. Though all care was taken in making the joints (the gauge standing frequently for some considerable time), slight white frothing of the soap and water could be detected. These weaknesses at the higher pressure were remedied; the pressure being let out of the main, and the joints caulked up and again tested. Before the tubes were jointed, and while still on the stools, each was thoroughly examined for abrasions of the hessian covering. This is exceedingly important with steel tubes, owing to their readiness to corrode when unprotected. All faulty places were rewrapped with hessian and covered with bitumen solution. After testing, all joints were thoroughly covered with hot solution, wrapped with hessian, and then covered again with hot solution. The compressor used for testing was driven by a petrol engine mounted on a four-wheeled bogie. After this brief description, we will now go back to the outlet of the compressors at the works. An egg-ended boiler 31 ft. 6 in. long by 5 ft. diameter, after being tested for soundness, was utilized as a receiver; the object of this being to form a reservoir for the gas, and to soften-down any impulses from the compressors.

For the first part of the scheme, a main was run from the outlet of the receiver at the Ayre's Quay Works to Whitburn-by-the-Sea; and in connection with this section, 10,227 yards of tubes were used. The first part consists of 1561 yards of 6-in., 1745 yards of 4-in., and 3226 yards of 3-in. steel tubes, together with



Machine used for Testing. Fitting on the left was used on end of main when test was carried out.

3695 yards of 6-in., 4-in., and 3-in. cast-iron pipes from the outlet of the governors. This section was started on Aug. 11, 1919, and completed on March 12, 1920.

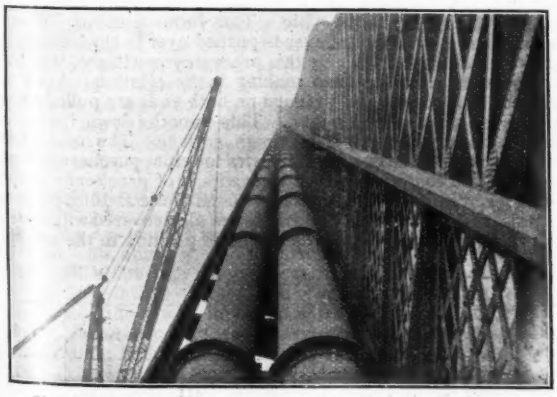


View of Alexandra Bridge, where High-Pressure Pipe Crosses.

The main crosses the Alexandra Bridge, by way of the approach road. This bridge is of the double-deck type; the upper deck being used for mineral and other traffic, and the lower deck for passenger and vehicular traffic. It was built in 1909. At the time of building, provision was made for carrying one water main of 21 in. dia., and one gas-main of 17 in. dia., on both sides of the bridge—*i.e.*, two mains on the west side and two on the east side—all supported on cantilever brackets.

It was decided to use the 17-in. steel pipe on the west side to convey the high-pressure gas. The bridge, with the approach roads, extends to 660 yards in length; the span from the main buttress at the south end to the main buttress at the north end being 349 yards, and the height from the under side of the lower deck to high-water mark being 80 ft. This length of gas-main contains four expansion joints. This main was tested by filling with water, and subjecting to a pressure of 50 lbs. per sq. in. Before this pressure was reached, it was found that more than three-quarters of these joints were leaking badly. When this was seen by people under the bridge, and by those working in the shipyards in the vicinity, reports were sent to the Water Company to the effect that their main had burst. As the Company knew we were busy testing, they were not unduly alarmed. To the 17-in. steel main a 17-in. cast-iron pipe was connected at both ends, and these were found to be in the same condition as the steel portion.

The joints on the 17-in. steel tubes were of the flanged type with copper ring. The worst leak proved to be nearly in the centre of the bridge. Upon examination, this was found to be the result of a damaged flange. When the pipes were placed in position by the contractor, at the time of building, they were lowered from the upper deck of the bridge; and in the act of lowering, the flange had apparently been damaged by coming in contact with some of the neighbouring ironwork; the damaged portion at the bottom of the pipe being at least 1 in. out of true. To remedy this, a powerful paraffin lamp was used thoroughly to heat-up the damaged part. The flange was then slowly hammered back into position; the joint being taken to pieces for this operation. Fortunately, nothing gave way; and a tight joint was eventually made. Most of the other leaks were remedied by tightening-up the flange bolts. The whole of the mains over the bridge were finally tested with air at 50 lbs. per sq. in., as previously stated.



Showing Gas and Water Mains over Bridge. Taken from the South Side.

To get at each joint on the span of the bridge, over the water, a travelling crane had to be brought into action. Upon examination this was found incapable of being moved, all propelling ropes were rotted through, and practically all working parts were rusted together. Through the generosity of the Railway Company, this was put in working order at our expense, and manipulated by their workmen—ten in number—who had to travel a distance of 11 miles to the job each day. South and north ends of the bridge main having been joined up, after satisfaction that all was sound, the 6-in. main was continued up to a point where a connection was left to be continued to Castletown at a later date.

The 1561 yards of 6-in. main, including the tubes, labour, jointing material, cartage, paving and reinstatement of roadways, watchman's time, testing, and connecting-up to the 17-in. bridge main, cost £1 3s. 2d. per yard. About one-third of this distance we had very deep cutting with granite set pavement on 8-in. concrete. From this point a 4-in. steel main, 1745 yards in length, was run. A boosting station was erected, to allow gas to be passed through the district governors to the low-pressure mains. There was difficulty in obtaining land for such a station at this particular place, and we eventually obtained permission from the Rural District Council to excavate a portion of an island site large enough to accommodate the district governors. The sides were bricked-up and cemented, and a roof formed with ferro-concrete and fitted with a glass pavement light. In this instance, a single set of 3-in. Reynolds governors was installed. The dust box here, in fact in all cases, has been fixed on the inlet side of the valve, so as to help to check the amount of rust and other deposits getting into the valve seating. The cost of this section of the 4-in. main works out at 17s. 2d. per yard, including the tubes, jointing material, excavating, cartage, reinstating, and all labour, &c.

From this governor house, or boosting station, a 3-in. main was laid to the governor house at Whitburn. In this case, the governors were fixed in a small house erected inside the then disused retort-house, and these comprise a double set of 3-in. Reynolds governors. These are given a turn of duty one per month—No. 1 being used for one month, No. 2 the next, and then reversed again to No. 1; the date of the change-over being entered on a card which is fixed on the operating wheels of the valves on each governor. The equipment in this governor house, apart from the governors themselves, consists of a 7-day high-pressure recording gauge, a 24-hour low-pressure recording gauge, and two low-pressure U gauges.

Outside the governor house, valves were fitted on the high-pressure inlet and low-pressure outlet. A by-pass with valve from the high-pressure side to the low-pressure, and operated in the governor house, was fitted so as to hand-feed the district in case of the governors being out of action. The cost of laying the last section (3226 yards) of 3-in. steel main was 12s. 3d. per yard, including, as in previous cases, the tubes, jointing material, labour, carting, and reinstating, &c.

From the old gas-works, the two original 4-in. mains previously used and running to the village were connected to the outlet of the governors, together with one new 6-in. main which was run a distance of 888 yards, branches being taken therefrom at convenient places in the village.

As is customary when taking over rural gas-works of this type, the usual amount of quaint main service laying was found; some of the mains having less than 6 in. of cover. In some instances, four and five houses were connected up with long lengths from one ¾-in. pipe, and whole streets were supplied by a 1½ in. main. The number of consumers at the time of taking-over was 222, and to-day is 433. The consumption of gas at the time of taking-over was 2,265,000 c.ft., and to-day is 7,108,200 c.ft.

The pipeline to South Hylton was taken a distance of 4830 yards. This was started on March 13, 1920, and completed on June 17, 1920. After 1497 yards of 4-in. main had been laid, provision was made for the second boosting station. This consists of a 3 in. single set of Reynolds governors, and is fitted with low and high pressure recording gauges, and by-pass. The cost of this section, including tubes, labour, jointing material, transport charges, and reinstatement of roadways, &c., was 15s. 5d. per yard. From this governor house, or boosting station, an additional 3009 yards were laid to the governor house, and 1169 yards of cast-iron pipe beyond. The equipment here was a duplicate of the Whitburn set, and fitted up in like manner with low and high pressure gauges, and by-pass connections from the high-pressure main to the low-pressure, for the purpose of hand-feeding the district in case of failure of the governors. The cost of running was 10s. 8d. per yard, including, as before, all costs such as labour, jointing material, carting, reinstatement of roadways, &c.

The consumers at this village now number 510. The gas consumption at the time of taking-over was 6,426,000 c.ft., and the last available figures show 11,684,900 c.ft., and these are being

Castletown Governor House—Inside View.

augmented almost daily. In addition, 77 street lamps have been connected to our mains. In Hylton, as at Whitburn, a good proportion of antique fitting work was found, one very interesting pipe being made of cast-iron and fitted with the ordinary spigot and faucet joints. The internal diameter was only ¾ in., and the joints were run with lead. The metal was in excellent condition, and must have been in the ground for many years. Another unique piece of fitting was a supply taken from the pipe at the top of a lamp column, running over the pathway to the upstairs portion of a tenemented property.

The section of main supplying the colliery village of Castletown was delayed until a later date, owing to the very heavy cost of material and labour. In April, 1922, we commenced laying this section, which was completed in June of the same year. In all, 3956 yards of steel tubes were laid—1609 yards of 4-in., and 1146 yards of 3-in. steel, and 1201 yards of 3-in. beyond the governor house. The cost of the 4-in. was 9s. 6d. per yard, and of the 3-in. 8s. 2d per yard. These prices include the tubes, labour, cartage, and all other charges. Castletown is purely a colliery village; and prior to the Company buying this property from the Colliery Company, the residents obtained a supply from the small Colliery Gas-Works, but only a portion of the residents had a supply. The number of consumers before being taken-over was 55 slot and 39 ordinary, with a consumption of 975,400 c.ft. per annum. The number of consumers to-day is 427 slot and 149 ordinary, with a total consumption of 5,786,000 c.ft.

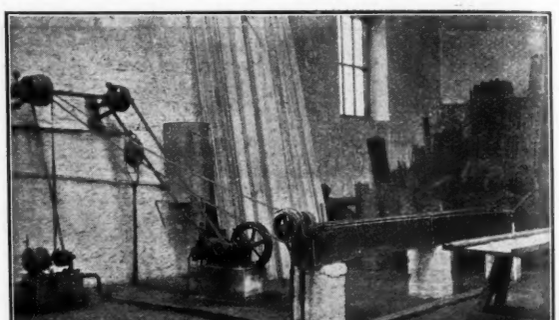
To achieve this extra consumption, in addition to laying the mains mentioned above, 500 services were laid, 427 houses were fitted-up with slot-meter installations, and 60 street lamps were connected to our mains. Two villas were fitted with pipes and fixtures, and two high-pressure governors were placed on the line of service direct from the high-pressure main; the governors being fixed in pits in the garden of the villas. A little to the west of this place, twelve aged miners' homes were supplied, and a 2-in. high-pressure governor was fixed in the grounds, a low-pressure main run from the outlet, and the services taken-off for each home. One farmhouse, one cottage, and two street lamps were also connected-up in a like manner. Approximately every half-mile, on all the sections, valves were inserted in the line of main, to facilitate testing when laying, and for general use afterwards, in case of necessity.

At all three villages the existing gasholders were used for storage purposes in the early stages, the compressors running from 6 a.m. to 12 p.m., and the pressures arranged so that the excess pressure automatically filled the holders. This worked admirably for a time, until the gas consumption increased beyond the small holder capacity, when it was found necessary to run the compressors throughout the twenty-four hours. This method of using district holders seems to be an ideal one, providing the storage is sufficient to meet the demand while the compressors are not running. The poor condition of the holders formed a contributory reason for discarding same. The Hylton pressures are run rather higher than others, owing to the village being situated on the banks of the River Wear, there being a drop of about 100 ft. between the governor house and the lowest level.

I would now like to say a few words about the deposit of rust, which causes us a good deal of anxiety. In the Whitburn and South Hylton sections, the tubes, being new, were used as received, with the exception of brushing each with special brushes made to fit each size. It is interesting to note that with both the above sections we have had considerable trouble with rust forming in the seating of the valves at both governor houses. Deposition has also taken place in the governors themselves, which have to be periodically cleaned out. As much as two pails of extremely fine rust have been removed therefrom. With the Castletown section, which was the last section completed, we took the precaution thoroughly to wash out all the tubes with paraffin oil, and then coat them inside with used machine oil. Recent examinations of the governors and valves prove the efficacy of the oiling, as up to the present rust has not been found.

Along country roads it is wise to adopt a method for showing the position of the gas-mains with the necessary valves and syphons. When road-widening operations take place, these tablets are naturally removed, and the new measurements are fixed to same. These are placed against walls or hedges, and buried in the ground about 18 in. These are a great help, especially where the line of main, when laid, follows a fence or a wall on sharp curves and bends, and then the local authorities straighten out the road leaving the mains, to all intents and purposes, in a most irregular line compared with the new road line. The tablets are made of cement and sand, and are 2 ft. 6 in. long, with three pieces of ⅜-in. iron rod for reinforcement purposes. The small tablets are made of brass, and are screwed from the front on to a square and tapered wooden plug, which is recessed and cemented into the back. H.P. denotes high pressure, V denotes valve, and S denotes syphon; the figures being the distance from the wall or fence, and the small figure at the bottom denoting the size of the main.

The transport of all pipes, material, and men was carried-out by our own motor lorries; the trailer used being made by our men. The steel tubes rest on the upper carriage over the wheels of the trailer, and the other end of the tubes rest on a revolving table just inside the back of the lorry; the object of this being to protect the hessian covering on the tubes when turning corners.



Pipe Wrapping Apparatus Designed by the Author of this Paper.

The service pipes used on this job, as with all service pipes used by the Company, are protected in a similar way to the Mannesmann tubes, the dipping and covering being done as the tubes are required—*i.e.*, a week's, or more, stock only being wrapped at a time. The plant, which is of the writer's own design, consists of a trough long enough to hold the longest wrought-iron pipe used by the department. Underneath this there is a long gas-burner from end to end. The trough contains bitumen solution. The power used for revolving the tube is a small ¾-H.P. gas-engine, while there is a small gas-compressor for supplying gas to the burner. The power is transmitted to a small countershaft, and from there to a set of fast-and-loose pulleys fixed on the end of the trough. From the central shaft of this pulley a large-tooth cog-wheel is fixed which engages in another cog-wheel underneath the centre; the one underneath being just under the top of the heated solution, and supported on brackets from the bottom of the trough.

In the centre of the bottom gear wheel, a square has been made in which engages a square on the cap that slips over the end of the pipe, to prevent the solution running inside, and made long enough to use the tongs for connecting purposes on the district. The process of covering is simple and is quickly done. On the side of the trough, at the gear end, is a lever which operates the fast-and-loose pulley. Caps are slipped on the pipe, and then laid in position. The operator then switches on to the fast pulley. This revolves the tubing in the solution. A roll of hessian, 6 in. wide, is placed against the revolving tube at the opposite end, and the operator walks along the trough allowing the hessian to overlap about 3½ in. This forms a spiral. When it reaches the gear end, the lever is pushed over to the loose pulley, and the hessian cut off. By this process, you will see, the tubing and hessian get a thorough soaking in the solution. After this, the tube is lifted out, and the caps on both ends are pulled off, and it is rolled on a sanded bench. This smooths down the spirals, and helps to form a hard smooth surface. The cost of this covering is less than one-half the extra for pipes purchased already covered, and there is the added advantage of practically keeping one stock of tubes. The exposed ends left for handling purposes, sockets, and connections and bends are also covered with hessian and solution after testing, when fitted in position in the trench.

Summary.

| — | Whitburn. | South Hylton. | Castletown. | Total. |
|---|---|---|---|---|
| Number of consumers before taking-over . . . . . | 222 | 411 | 89 | 722 |
| Number of consumers, 1924 . | 433 | 543 | 576 | 1552 |

| — | Whitburn. | South Hylton. | Castletown | Total. |
|---|---|---|---|---|
| | C.Ft | C.Ft. | C.Ft. | C.Ft. |
| Consumption before taking-over . . . . . | 2,265,000 | 6,426,100 | 976,000 | 9,667,100 |
| Consumption in 1924 . . | 7,108,200 | 11,684,900 | 5,786,900 | 23,580,000 |

Yards of steel tubes used on the complete job . . . . . = 13,636
Yards of cast-iron pipes used on the complete job . . . . . = 6,065

Total . . . . . 19,701 yards = 11 miles 341 yards

The average costs per yard of the steel portion laid, including all charges, were:

| | £ s. d. |
|---|---|
| 6 in. . . . . | 1 3 2 |
| 4 in. . . . . | 0 14 2 |
| 3 in. . . . . | 0 10 11 |

The average costs per yard of the cast-iron portion laid, including all charges, were:

| | £ s. d. |
|---|---|
| 6 in. . . . . | 0 17 4 |
| 4 in. . . . . | 0 11 0 |
| 3 in. . . . . | 0 7 7 |

As this work was carried out during the period of high prices and wages, I think the costs may be considered satisfactory.

Finally, I would like to take this opportunity of thanking my Chief (Mr. Norman S. Cox, the Secretary of the Company) for the privilege of preparing and reading this paper.

### Discussion.

Mr. SHADBOLT, who presided to the close of the meeting, said they had had a contrast in papers that afternoon which had been interesting and valuable. Both merited close study. In Mr. Morfett's paper, the particulars of costs with regard to the supply of gas to the three villages he had described made them worthy of reference.

Mr. OULDS, of Tynemouth, asked if the small service governors had worked satisfactorily under high pressure.

Mr. WILSON, of Tynemouth, said that in the past they had had not only the outside of the pipes coated, but also the inside. They were not clear, however, of the fine deposits at the governor valves and chambers. He noticed there were no return mains to the town works. Direct supply was not so easy to handle as a boosting plant, when they could always rely on a return on the low-pressure mains. It was easier to control a belt line than to deposit at a terminus. Colliery districts were not so easy to supply as residential areas, because in the former the gas was used mostly for lighting. About a year ago, they had had a remarkable request—to supply the miners with extra pressure between 3 a.m. and 4 a.m; and this involved more work than they had anticipated. It compelled them to run a small compressor from midnight. In regard to the sizes of pipes, at Sunderland they might have had to put in larger pipes than they did at Tynemouth. He could not advocate laying pipes so small as 3 in. It was better to put in 6-in. pipes, and certainly not less than 4 in. Their latest development was 8-in. steel pipes. They had tried welded joints, but had not found anything superior to the lead wool and long sleeve joint.

Mr. BELL, Mr. WELLS, and Mr. BATT also joined in the discussion.

Mr. SHADBOLT congratulated Mr. Morfett on his ingenious machine for coating small pipes.

Mr. MORFETT, replying to the discussion, said there had been no trouble with naphthalene in the main across Alexandra Bridge. The only trouble they had experienced there had been in regard to subsidence. The pressure of gas now employed at the works was 9¾ lbs. per sq. in., and the same pressure obtained at the governors, which were three or four miles away. They had no trouble with the small governors. They specified wrought-iron pipes for services. Owing to the river, they could not get a return belt back to the works.

On the motion of Mr. F. P. TARRATT, seconded by Mr. OULDS, votes of thanks were accorded to Mr. Atley and Mr. Morfett for their papers.

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**A Book for Bungalow Dwellers.**—Everyone interested in the equipment of the modern bungalow will welcome the current issue (No. 122) of "A Thousand-and-One Uses for Gas," which deals in a popular but nevertheless practical manner with the equipment of the labour-saving bungalow, and contains a large number of illustrations of interiors and exteriors. The information given is designed to interest alike architects and builders who design and construct bungalows for sale, and private individuals who already own a bungalow, or are about to place an order for one in which are to be incorporated their own ideas. It covers such questions as kitchen equipment, heating, hot-water supply, lighting, and so forth.

**Midland Association of Gas Engineers and Managers.**—Mention has already been made of the fact that the spring general meeting of the Association is to be held at Stourbridge on Thursday, May 29. Members will be received at the gas-works at 11.50 by Mr. C. H. Webb (the Engineer) and the Chairman and members of the Stourbridge Corporation Gas Committee. After an inspection of the works, luncheon will be served at the Town Hall, at 1.15, when members will be the guests of the Gas Committee. Immediately after lunch there will be a short business meeting; and a drive into the surrounding country (always a popular feature) is promised for the afternoon. Members are invited to take tea with the Mayor and Mayoress of Stourbridge at the Town Hall at 4.15.

## LONDON AND SOUTHERN DISTRICT JUNIOR GAS ASSOCIATION.

### Annual General Meeting.

The Annual General Business Meeting of the Association was held at the Westminster Technical Institute, S.W., last Friday evening—Mr. WALTER GROGONO, of the Gas Light and Coke Company (the President), in the chair.

#### FINANCIAL STATEMENT.

The HON. TREASURER (Mr. A. Broadbent) submitted the financial statement, remarking that he was very pleased to be in a position to give so favourable a report. After allowing for a few small outstanding accounts, and the probable cost of the volumes of "Transactions" for the current session, there remained a sum of £95 to the credit of the account, which compared with £90 a year ago. This was a healthy condition of affairs; and as they were likely to have a balance of the year's working, they had every reason to be satisfied.

The PRESIDENT pointed out that one very small item was in connection with their affiliation with the Southern Association of Gas Engineers and Managers. He had on each occasion represented them on the Council of the Senior Association, and their own Council had expressed the opinion that the information he had brought back was very useful.

#### REPORT OF THE PRESIDENT.

The PRESIDENT then reported as follows upon the working of the Association during the past year.

Your Council are pleased to report that we have again had another successful session. The full programme of visits and meetings arranged at the beginning of the season has been carried out. The total number of members at the date of the last general meeting was 260. During the session 51 new members have been elected, 2 have rejoined, and 18 have resigned or have been struck off the roll due to the non-payment of their subscriptions. This leaves us with a membership of 295, or an increase of 35. Of the 51 new members, 34 were made associates.

As regards the past session, I would like to thank all those members who have come forward and read papers, and also Mr. F. W. Dye and Mr. Hampton. You will notice that, with the exception of these two gentlemen, all our papers have been read by our own members. I think that this spirit should be fostered, so that instead of the Council having to search for subjects for the programme, they should have only to sort out papers waiting to be read by members. I cannot pass from this subject of papers without mentioning the last meeting of the year. This meeting, as you all know, was described by the lecturer, Mr. Hampton, as a "picture show;" but, call it what you will, it was, in my opinion, the most enjoyable and instructive evening of the whole year. I hope that Mr. Hampton and Mr. Edwards understand how much we appreciate the trouble taken by them.

Now just for a minute we will turn to the visits. The meeting at the Fulham Works of the Gas Light and Coke Company was a record for attendance. The most interesting visit, in my opinion, was to the Poplar Works of the Commercial Gas Company. These works include the Chemical Works of this Company, and it is rather unique to find a combined works of this description being managed by one man.

I hope that we shall have good attendance at Reading on June 14, when we visit the works of the Reading Gas Company.

I should like to offer my thanks to the Secretary for all the good work done by him, and also to the Treasurer and all other members of the Council, and trust they will during the coming year give the same support to Mr. Newton Booth as they have given to me.

Mr. W. E. BROWN (Gas Light and Coke Company) proposed the adoption of the report, and agreed that the statement regarding the number of papers read by their own members was very encouraging. He, too, hoped that next session the members would "do the whole thing off their own bat." Mr. Grogono had made an excellent President.

Mr. W. FURMINGER (South Metropolitan Gas Company) seconded the motion, which was agreed to.

A hearty vote of thanks was passed to the retiring officers and Council for the work done by them during the past year.

#### TESTIMONIAL TO MR. GROGONO.

Mr. D. CLEAVE CROSS (Lea Bridge) proposed that the following testimonial be suitably emblazoned and framed, and presented to the President at the opening meeting of the next session:

> This testimonial is presented by the Council and members of the London and Southern District Junior Gas Association to Mr. Walter Grogono, upon the occasion of his completing his term of office as President for the session 1923-24.
>
> The increase in the number of members during the past session may be attributed largely to the energetic and enthusiastic manner in which he has carried out his duties, and the officers and members join in expressing their appreciation, and wishing him every success in the future.

He thought this adequately expressed their feelings towards Mr. Grogono.

Mr. S. B. CHANDLER seconded with great pleasure, because, as a Past-President, he knew what it was to have to conduct

the affairs of an Association of such importance. Of recent years the Association had grown greatly in every way, and the senior members of the profession much appreciated the work that was being done. Mr. Grogono had put his very best efforts into the carrying-out of the duties of the office, and was in the proud position of being President of the largest Junior Gas Association to-day.

The President, in acknowledgment, said that really no thanks were due to him, for the work was done by the Council, the Secretary, and the Treasurer.

Presentation to Mr. Winslow.

Mr. Anderson said he felt it a great honour to represent the members of the Association in making a presentation to their late Secretary, Mr. George Winslow. The Association had already given him an illuminated address, and the Council had made him a personal gift of a clock; but it was felt that something more was required from the ordinary members to mark the occasion. Mr. Winslow had done yeoman service for the Association, and had held office for eight years, which was a long period. He was always enthusiastic, and enthusiasm was essential in connection with an organization of this kind. The presentation was in the form of an oak bureau, bearing the following inscription:

> Presented to Geo. Winslow, May 1924, by members of the London and Southern District Junior Gas Association, as a mark of their appreciation of his services as Hon. Secretary of the Association during a period of eight years.

There was also a gold bangle for Mrs. Winslow, who had so loyally assisted him in his work.

Mr. George Winslow feelingly expressed his thanks to the members for their generous gifts.

New Officers.

The election of the following office-bearers for the next session was announced:

*President.*—Mr. W. Newton Booth, Woolwich Arsenal.
*Senior Vice-President.*—Mr. W. L. Westbrook, North Middlesex Gas Company.
*Junior Vice-President.*—Mr. A. Broadbent, Gas Light and Coke Company.
*Hon. Secretary.*—Mr. Leonard Lacey, Gas Light and Coke Company.
*Hon. Treasurer.*—Mr. A. Broadbent.
*Hon. Auditor.*—Mr. E. G. Merry, Gas Light and Coke Company.
*Council for* 1924-25.—Messrs. W. H. Noble, George Winslow, H. W. Kerridge, W. T. Kenshole, W. Bell, F. E. Woodfine, White, and L. E. Wellard. *Ex-Officio:* Messrs. W. Grogono and D. C. Cross.

The President said they all much regretted the absence from the meeting, owing to indisposition, of Mr. W. Newton Booth, who had just been elected to the chair.

## The Use of Ammonium Sulphate.

The spring issue of "Farm Notes" contains some very interesting information regarding the advantages to be derived from the judicious use of ammonium sulphate as a fertilizer. "Farming in this country," it is stated, "has reached such a high pitch of intensity that as much consideration and careful attention must be given to the feeding of crops as to the feeding of live stock." Though phosphates and potash are essential for plant growth, nitrogen is the most important plant food. Where nitrogen is deficient there follows a yellowing of the leaf, stunted growth, and a starved appearance. When nitrogen is supplied to a crop in the form of a nitrate there is the likelihood of a large portion of it being lost from washing out in the drainage water after a heavy downpour of rain. If, however, it is applied in the form of ammonia, it becomes fixed in the upper layers of the soil, and remains there until gradually changed into nitrates as the plants require it. Every farmer knows that nitrogen is the dearest plant food, and he naturally wants to buy as cheaply as he can. Neutral sulphate of ammonia supplies nitrogen in the cheapest form. It is readily available, and yet cannot be washed out of the soil. As a source of nitrogen for all the crops grown by the British farmer it is unequalled. A farmer's life is a warfare against weeds. The old way of getting rid of weeds meant a great deal of labour; and labour nowadays is an expensive item. Many successful men speak highly of sulphate of ammonia as a spray for killing weeds in fields of growing corn. It has been found that a spray solution made of 2 cwt. of neutral sulphate to 50 gallons of water works wonders in this respect, besides acting effectively as a top-dressing.

Among various awards made by the Council of the Institution of Civil Engineers in respect of papers read and discussed at the ordinary meetings during the session 1923-24, are Watt gold medals to Messrs. H. N. Allott, M.Inst.C.E., of Manchester, and S. L. Pearce, C.B.E., M.Sc.Tech., M.Inst.C.E., Chief Electrical Engineer to the Manchester Corporation. The paper, which made reference to the use of coke fuel in electricity works, was noticed in last week's "Journal" (pp. 378, 393).

# CORRESPONDENCE.

[*We are not responsible for opinions expressed by Correspondents.*]

## Flueless Gas-Stoves.

Sir,—I am in accord generally with the letter in your issue of April 30 from the pen of Mr. G. P. Olivier, with the exception of about the last four lines—"for the invention of a flueless gas-fire that will give off no more deleterious products of combustion than an ordinary 'universal' inverted mantle. I propose this as a standard, for if it be considered too liberal for a gas fire, the gas industry is doomed."

Obviously Mr. Olivier does not mean what he says here; but taking the proposed standard to mean the composition of the products of combustion given off from gas used in an ordinary lighting burner for a "universal" mantle, what sort of a standard would this be? I am very interested in the subject, and should be much indebted to Mr. Olivier, or any of your readers, if he or they will tell me how the products of gas combustion in a bunsen burner used with a "universal" mantle differ from the products used with any other mantle, and further, how, by using one or any burner, it is proposed to bring about in the products of combustion uniformity of composition, or anything like it. If Mr. Olivier has a flueless stove to meet this difficulty, he certainly need not mind mentioning it in your correspondence columns, even if he does thereby obtain a free advertisement.

*Gas Company, Queen's Road, Nuneaton, May 12, 1924.* George Helps.

# REGISTER OF PATENTS.

## APPLICATIONS FOR PATENTS.

**[Extracted from the "Official Journal" for May 7.]**

Nos. 10,374 to 10,999.

Boardman, F.—"Asbestos fuel, &c., for gas-fire." No. 10,618.
British and Foreign Lime and Power Corporation, Ltd.—"Manufacture of gaseous fuel from lime-kiln gases." No. 10,989
Cutler, E. E.—"Water-luted joints for telescopic gasholders." No. 10,603.
Cutler, E. E.—"Water-tube gas-condensers." No. 10,852.
Cutler, S.—See Cutler, E. E. Nos. 10,603 10,852.
Forster, J. D.—"Coin-freed gas-meters." No. 10,777.
Granhult Aktiebolag, H.—"Gas-regulators for heating-apparatus." No. 10,745.
Haug, J. S.—"Method of introducing jet of steam, &c., to fuel bed of water-gas generator." No. 10,875.
Helps, G.—"Gas-cookers, &c." No. 10,733.
Humphreys and Glasgow, Ltd.—See Haug, J. S. No. 10,875.
Jolly, J. C.—"Carbonization of bituminous caking coals." No. 10,746.
Kämpe, H.—"Gas-fires." No. 10,893.
Knight, E. O.—"Inverted incandescent gas-burners." No. 10,925.
Laube & Co.—"Filling gas-exhausters for coke-ovens." No. 10,755.
Metropolitan Gas Meters, Ltd.—See Forster, J. D. No. 10,777.
Nellissen, W.—"Gas-indicating devices." No. 10,438.
Reichwald, A. W.—See Laube & Co. No. 10,755.
Reid A. T.—See British and Foreign Lime and Power Corporation, Ltd. No. 10,989.
Ricardo, H. R.—"Compressors for air or gas." No. 10,694.
Smith, E. W.—"Variable gear for prepayment gas-meters." No. 10,610.
Smith Meters, Ltd.—See Smith, E. W. No. 10,610.
Stockley, C. J. R.—"Gas-condenser." No. 10,761.
Storey, J. E.—"Gas-ring burners." No. 10,378.
Storey, R.—See Storey, J. E. No. 10,378.
Tait, W.—See Storey, J. E. No. 10,378.
Turner, E.—"Gas and air, &c., mixer and/or regulator." No. 10,961.
Turner & Co., E.—See Turner, E. No. 10,961.

**Derby's Problem of Geysers or Boilers.**—At last week's meeting of the Derby Town Council, a recommendation of the Housing Committee to instal geysers instead of boilers in Corporation dwellings caused some discussion. Mr. Brown moved an amendment that the recommendation be referred back to the Committee, maintaining that the back-boiler system was cheaper to the tenant, and that with the present scientific mixing of Derby water there was no corrosion of galvanized-iron pipes. Mr. Porter seconded the amendment. Mr. Hanlon supported the Committee's recommendation, and said he had a geyser at his house which was cleaner, more satisfactory, and cheaper to fit than a boiler. Ultimately the recommendation to instal geysers was adopted.

**Cape Town and District Gas Light and Coke Company, Ltd.**—At the meeting next Wednesday (May 21), the Directors will report a total balance at credit of revenue account of £20,691, and will recommend the payment of a final dividend on the ordinary shares of 4 p.ct. (making, with the interim dividend already paid, 7 p.ct. for the year), leaving £3750 to be carried forward. Depressed conditions of trade and business continued throughout the year, unfavourably affecting the consumption of gas per consumer as compared with the previous year, with a consequent decrease in revenue from gas sales. This decrease was, however, partially off-set by reductions in expenditure and by improved results from the working of the Company's plant. The opening of a new showroom, systematic advertising of the uses of gas, and expert demonstration of gas appliances have assisted very materially in securing additional consumers; there being the satisfactory increase of 416 at the end of the year.

# LEGAL INTELLIGENCE.

## ACTION ARISING OUT OF A BROKEN MAIN.

### Wandsworth Gas Company sue the London County Council.

An action of considerable importance to gas companies was opened before his Honour Judge BAIRSTOW, K.C., at the Wandsworth County Court, last Thursday week, when the Wandsworth, Wimbledon, and Epsom District Gas Company sued the London County Council for £19 1s. 11d., the cost of repairing a broken gas-main, and for damages for alleged negligence, and, alternatively, for trespass and nuisance. Defendants denied that they had been guilty of negligence, nuisance, or trespass, and did not admit that the gas-main was in existence at the date alleged by the plaintiff Company. Defendants also relied upon the Statute of Limitations and the Public Authorities Protection Act, 1893.

Mr. FOX ANDREWS (instructed by Messrs. Sloper, Potter, and Gosden) appeared for the plaintiffs, and Mr. LANCELOT FLETCHER for the London County Council.

Mr. FOX ANDREWS said the claim was for damages in respect of a broken gas-main in St. John's Road, Putney, the property of the plaintiffs. The main was laid about 1870. It appeared that in 1882 the Metropolitan Board of Works carried out certain work in connection with their sewers in St. John's Road, and this work included the construction of a manhole under the road. The manhole was built of bricks, which were placed over and under the gas-pipe, and were in contact with the pipe all round. The consequence was that the gas-pipe, at that point, was rendered inflexible. No allowance had been made for a subsidence of earth or for any movement of the pipe due to vibration caused by the traffic on the road above. The other part of the gas-main would probably move in the course of years through pressure, but at this particular point the pipe was quite unable to do so. On Oct. 17, 1923, an escape of gas was reported to the Company. This was duly investigated, and it was found that the main had given way at the point where it was encased by the brickwork of the manhole. He understood that it might be suggested by the defence that the pipe was laid subsequent to the construction of the manhole. He did not think he would be able to show definitely when the main was put in, but he would be able to prove that it was there in 1870, and that there were consumers of gas in St. John's Road at that date. Since that year no new main had been laid in the road. In case the defence should suggest that the fracture was caused through the pipe being in a worn-out condition, evidence would be called to show that it was in a perfectly good state, and that there was no sign of deterioration, either external or internal. The plaintiffs contended that it was an act of negligence to have constructed a manhole over their gas-pipe; but if it were necessary to place the manhole at that particular spot, the Metropolitan Board of Works should have employed scientific means in carrying out the work. They should have arched their brickwork, thus leaving space for the movement of the main. To build brickwork solidly on to a main like this was a very bad piece of engineering. Arrangements had been made for the actual scene of the broken pipe to be inspected. Counsel then dealt at some length with the legal position, and cited several cases in support of his argument.

Mr. FLETCHER, referring to the question of statutory duty raised by Mr. Andrews, said that this point was not mentioned in plaintiff's particulars of claim.

Mr. FOX ANDREWS replied that, if necessary, he would ask his Honour to allow the particulars of claim to be amended. Proceeding, he contended that the London County Council were liable for the acts of the Metropolitan Board of Works.

*E. J. Foster*, a clerk in the inspectors' office of the plaintiffs, produced several books and ledgers to prove that there was a gas-main in St. John's Road as far back as 1874—several years before the manhole was put in by the Metropolitan Board of Works.

*William Arnold*, a jointer and fitter's labourer, said he had been in the employment of the Company for 46 years. He gave details of repairs which he had carried out in connection with the gas-main in St. John's Road. These repairs, he said, arose out of escapes of gas from the sockets. The main itself was in excellent condition. No main had been laid in St. John's Road since he had been in the Company's service.

*Thomas E. Edwin*, assistant main and service layer in the employment of the Company, stated that last October there was a leakage which was traced to the main in St. John's Road. He found the main close to the manhole was broken. Apart from the crack, the main was in very good condition.

Mr. *W. A. Barrett*, District Inspector, also said the main was in good condition, both externally and internally.

Mr. *Henry A. Wall*, Chief Inspector of the Company, considered the cause of the crack was through the pipe being held tight in the brickwork of the manhole. There was no deterioration of the main.

Mr. *Cyril Murton Croft*, Chief Engineer of the Company, said the matter of the broken cast-iron main was brought to his notice immediately after its discovery in October last. The crack in the pipe was caused because one end was rigidly held by the brickwork round the manhole of the defendants' sewer. The rest of the pipe had been subjected to some deflection, either by subsidence below or pressure above, at the point where the pipe was held rigid by the brickwork. This deflection was so great that it cracked the pipe at exactly the spot where one would expect to find a crack—namely, at its exit from the rigid area. It was necessary to make allowance for a certain amount of movement in the pipeline, and the brickwork ought to have been constructed in the form of a circular tunnel. If the brickwork had been built perfectly clear of it, the pipe would not have cracked. The pipe in question was in excellent condition.

Mr. FLETCHER: With motor traffic, there must be vibration set up in this roadway day and night?

*Witness*: Yes, but we have not had more trouble in this respect in recent years than in former times. The mains are of sufficient strength to carry the traffic. This is not a road, however, which is used for very heavy traffic.

His HONOUR: Have you a theory as to how this accident happened?

Mr. FLETCHER: We have not the smallest idea. There might be four or five alternative causes. (To Witness.) Might you not get a gas-main broken in the ordinary way by traffic passing over it?

*Witness*: No; we have 360 to 400 miles of mains, and we have had no breakages through this cause.

In reply to further questions, Witness said that in the Wandsworth Gas Company's Act of 1912 there was a provision that the mains should be laid at a depth of 3 ft., "unless otherwise agreed." That provision was inserted at the request of the Epsom Rural District Council.

Mr. FLETCHER: Do you say that this provision has nothing to do with the growing use of the roads for heavy motor traffic?

*Witness*: I am certain it has not.

Mr. FOX ANDREWS: In your opinion, as Chief Engineer of one of the largest Gas Companies in London, are gas-mains materially affected by the increase of traffic on the roads?

*Witness*: No. The pipes, he added, were constructed to carry a considerably heavier weight of traffic than they got on the roads at the present time. When he was with the Commercial Gas Company, he never saw a gas-main broken as the result of traffic, which was heavier and greater than the traffic in the district served by the plaintiff Company.

At this point the case was adjourned.

# MISCELLANEOUS NEWS.

## TESTING GAS-METERS IN BIRMINGHAM.

### Annual Report of the Official Inspector of Gas-Meters.

In his report to the Birmingham City Justices' Gas-Meter Testing Committee for the year ended March 31 last, Mr. Frederick Colburn states that the number of meters tested totalled 129,683, as against 115,052 during the previous year—being an increase of 14,631, or 12·7 p.ct.

The fees charged amounted to £7132, an increase of £714 above the previous year's figure. The expenditure for the year amounted to £3064, showing a credit balance on fees of £4068, which has been carried to the Borough Fund. In accordance with the statutory requirements of the Weights and Measures Acts, four 10-c.ft. standard holders have been overhauled and repaired, and re-verified *in situ* by comparison with the cubic-foot bottle of the Standards Department, London, who have re-stamped and certified the holders as correct measures. During the year, one 10-c.ft. standard holder was purchased to be used in place of other holders out of action for repair or overhauling; and two ventilating fans are being installed in the roof of the building for the more efficient ventilation, and control of the temperature, in the test room.

Attached to the report are statistical tables giving an analysis of the results of the meters tested. Of the meters tested, 4653, or 3·58 p.ct., were rejected, as against 5·06 p.ct. last year. Of 14,798 wet meters, 1021, or 6·8 p.ct., were rejected; and of 114,885 dry meters tested, 3632, or 3·1 p ct., were incorrect.

Other tables show the cause of error in meters rejected, and the cause of rejection in meters submitted for certification. Of the 4653 meters rejected, 2085 were more than 2 p.ct. fast, 880 were more than 3 p.ct. slow, and 329 were rejected for excessive absorption of pressure. Of 726 meters submitted for certification, 503, or 69·2 p.ct., were incorrect, 263 were more than 2 p.ct. fast, 58 were more than 3 p.ct. slow, and 27 passed gas without registering, while 61 were leaking internally or passing small quantities of gas without registering.

Of the 36,289 new meters submitted, 17,244 were of the standard sizes, as against 9120 last year. Repaired meters numbered 92,668. Of the total tested, 82,824, or 63 8 p.ct., were prepayment meters. The highest monthly percentage of rejection was 4·2, and the lowest 2·7.

**A Surplus at Chorley.**—At a meeting of the Chorley Gas Committee, the balance-sheet for the half-year ended March 31 was approved, and a sum of £6035 surplus on the six months' working of the gas-works was allocated to the relief of rates. At the Council meeting, Mr. R. Smith sought to move an amendment to apply the surplus to a reduction in charges; but this was ruled out of order, the Town Clerk remarking that the surplus had automatically to be devoted to the relief of rates. Mr. J. G. Ashton said this was most unfair, as large ratepayers were not necessarily gas consumers. Alderman Heald (Chairman of the Gas Committee) said that, far from the gas undertaking being adversely affected by the advent of electricity, they had had a record year.

**Audley Gas Affairs.**—At a special meeting of the Audley Urban District Council last week, the Chairman of the Gas Committee (Mr. E. Pryor) reported that the Committee had met to consider the estimates, to endeavour to bring about a reduction in the price of gas. Last year there was a gross profit on the gas-works of £1831, and a net profit of between £900 and £1000. The estimated income for this year showed a reduction of £500 compared with last year. It would be possible to make a reduction in the price of gas of 1s. per 1000 c.ft. from July. This was very encouraging, and he regretted that the Committee could not see their way to grant a reduction immediately. Mr. T. L. Nicklin expressed the pleasure he felt that the gas-works seemed to be on a sound basis, and had a real opportunity for a substantial reduction in the price of gas, without injuring the ratepayers generally. Mr. J. H. Maddock (Chairman of the Finance Committee) gave notice of his intention to move at the next meeting that the Audley Gas-Works be conducted as a municipal trading concern, with its accounts as a commercial undertaking separate from the general district rate.

## BOMBAY GAS COMPANY.

An Ordinary General Meeting of the Bombay Gas Company was held at the offices of the Company, Moorgate Station Chambers, London, E.C., on Thursday, May 8. Mr. H. E. Jones (Chairman of Directors) presided.

The notice convening the meeting, and the auditors' report, were read, and the Directors' report and the accounts for the year ended Dec. 31 last were taken as read.

### The Chairman's Remarks.

The Chairman, in moving that the report and accounts be adopted, first dealt with the profits, and said that the balance forward would be £2000 more than in the previous year. He thought it would be agreed that a dividend of 8 p.ct., in view of the very depressed state of trade prevailing, was not unsatisfactory. This trade depression had been partly lifted, and he was glad to say that a small decrease in the sale of gas resulting from this depression had been converted into an increase, though not a very golden one. There was no doubt that, when times improved, the multitude of uses for gas would prevail, as they had done in all parts of the world, and that the Company would continue to make progress. At any rate, they were so impressed with the necessity for providing for the large extensions—he might call them territorial or building extensions—taking place at Bombay, where they were developing in all directions, that there was no doubt that they would have to lay considerable lengths of new mains and provide for a larger distribution. Therefore, in this connection, the Directors had been taking steps with a view to the issue of further capital. In so doing, they were making arrangements by which the existing shareholders would be privileged to secure one thousand shares in the Company, and he himself should certainly apply for some of them. The shareholders on the other side of the table could not do better than apply for some also. As to the prospect in India, this was not very golden. The undertaking was not developing so rapidly as some of the undertakings in England, but it was very steady and very sure, and all expenditure out of the ordinary line was chiefly for pipes for new houses, and the various stoves and appliances which were now being largely employed. It was rather singular that even in the hottest climates, where a man did not want a fire, but wanted something to cool him, the best cooler seemed to be a hot bath. It was a fact that in all parts of the world with which he was connected —which were not a few—there was an enormous use of gas in the hot climates for purposes which his ancestors had never dreamed of. With regard to the working of the Company generally, this was, within a shade, as successful as it had ever been. They sold a large quantity of gas per ton of coal; the coke market—which at one time was rather depressed, so much so that they had fitted up a water-gas plant to absorb some of the surplus—had improved, so that the water-gas plant had not been needed. The coke sale in Bombay had become better again, and there seemed to be no fear of the future. The general working results showed, apart from economy in the technical operation of the plant, that the Company were very considerably, not to say heavily, addressing themselves to the question of maintenance. When a thing was worn out, there were two ways of dealing with it. They could either patch it up or replace it with something better, and in both these directions they could generally effect some little improvement in its operation. Therefore, true maintenance, in the view of an old campaigner such as himself, was to provide for some little improvement either in the economy or the power of working; and it was for this reason that Mr. Burch (Engineer and Manager at Bombay) and his predecessor had always been calling upon the Directors to spend a considerable sum on maintenance. Some companies, even in England, would pay dividends without attending to maintenance. This, however, was a very short-sighted policy, and the first thing he looked for in a company's accounts, after seeing what profits had been made, was the amount spent on maintenance. If this was insufficient, then profits did not exist. If they looked at the accounts of the Bombay Company for years past, it would be seen that the maintenance charges were all thoroughly good. The sale of gas was less during the past year by about 3 p.ct. than in the previous year, but it was reassuring to find that this was coincident with a great prostration of trade in Bombay. There was also considerable tightness in money, just as was felt on this side, and people did not throw money away on gas or anything else. The bulk of the decrease had occurred in the first half of the year, but recovery had already been made, and the improvement in the second half of the year had been such that the percentage of loss on the whole year was only half the percentage of loss for the first six months. The Manager at Bombay was very annoyed—and he (Mr. Jones), as a practical engineer, shared his annoyance—at the fact that in Bombay, where they had a very cheap supply of electricity, they had installed some electric street lamps where they ought to have erected gas-lamps. A trumpery report had been put before the Commissioner there, in which it was pretended that economy was effected by using electric light. But, said Mr. Jones, it was not genuine economy, because they had put the electric lights so far apart that the efficiency was decreased. It was a bad way of lighting, to have powerful lamps a long way apart. Gas lighting would have been better, as illustrated in this country, where electric lights had been driven out of the streets. In Whitehall, Victoria Street, and anywhere in the West End of London, they would find electric light taking a back seat. It ought to do so in Bombay; but where they had a liberal gentleman, Mr. Tata, who dammed up waterfalls and obtained enormous power without burning coal, a larger supply of electricity must be expected. He agreed that electric light was convenient for offices, and there was electric light in the Company's own offices.

Mr. William Graham Bradshaw, C.B.E. (Deputy-Chairman), seconded the adoption of the report and accounts.

### Discussion on the New Capital.

Replying to questions,

The Chairman said the new capital was to be issued almost immediately, in the form of shares, and not debentures.

A Shareholder asked whether the Directors had discussed the advisability of issuing preference or debentures instead, because a thousand shares at £5 each only amounted to £5000. A thousand shares would be a drop in the ocean.

The Chairman stated that 4000 shares would be issued, amounting to £20,000, and that 1000 were being offered to the existing shareholders.

The Shareholder said there was a temptation to offer them at £5. The present price was only about £5$\frac{1}{16}$.

The Chairman remarked that the matter had had the fullest consideration by the Board.

Mr. Bradshaw said that the Board had fully considered the problem of issuing debentures, but, to do this, and make the new issue a first charge on the Company's property, would greatly restrict the powers of the Directors if they wanted to borrow from bankers. The Company's assets were in India, and not in England; and if the bankers saw debentures on the concern, they naturally asked where they themselves were to come in. Therefore, it was considered better to issue those shares, which they were authorized to do by the shareholders three or four years ago. They had been waiting for a favourable opportunity—which had now arrived—to make the issue, in accordance with the wishes of the shareholders. They had sold the shares, but had arranged with the purchaser that he would give to the shareholders who applied up to 1000 shares at the price of issue. Applications should be made to the Secretary of the Company, who would pass them on.

Mr. Spencer congratulated the Board and the Manager on the excellence of the report; every figure given must appeal to every member, and the balance-sheet was most satisfactory. If the Company wanted £40,000, they could get it as easily as £20,000. The only adverse figure in the balance-sheet was the temporary loan of £28,000, which compared with £16,000 in the previous year. He agreed that the cheapest way to borrow money was to go to the bankers.

Mr. King Hiller asked whether a sulphuric-acid plant had yet been installed.

The Chairman regretted that it had not, because to put up such a plant on present prices would be too expensive. He was waiting to erect plants for making sulphuric acid for three different gas undertakings, but was debarred by the high prices for the structural materials, and was not encouraged by the lower prices now being asked for sulphuric acid in this country. But, inevitably, the Company must instal such a plant, because it would convert what might otherwise be a loss into a source of profit.

The report and accounts were adopted *nem. con.*

### Declaration of Dividend.

The Chairman then moved that a final dividend for the year ended Dec. 31, 1923, of 4 p.ct. (less income-tax at the rate 2s. 4½d. in the £) be declared, payable on and after the 17th inst., making, with the interim dividend of 4 p.ct., a dividend of 8 p.ct. for the year.

Mr. Bradshaw seconded.

The motion was carried unanimously.

### Re-election of Directors.

Mr. Louis Penny proposed the re-election of the retiring Directors, Mr. H. E. Jones and Mr. W. G. Bradshaw, C.B.E. Mr. Jones, he said, had been the life and soul of the Company ever since he had accepted a seat on the Board, which was 34 years ago, and he had been Chairman for 21 years. From its birth the Company had been a very successful one, but a great deal of the success in late years had been due to the efforts of Mr. Jones and Mr. Bradshaw. Everybody knew Mr. Jones as a great authority on gas, and as being at the head of his profession. Mr. Bradshaw had great financial knowledge, and had valuable experience as Chairman of one of the largest gas companies in London. Therefore, the shareholders would not do wrong in re-electing these two gentlemen for another three years.

Mr. Charles Hunt seconded, and endorsed all that Mr. Penny had said in support of the resolution.

The resolution was carried unanimously.

The Chairman, in returning thanks for the re-election of himself and Mr. Bradshaw, said they both liked to enjoy the confidence of the shareholders.

Mr. Hills proposed that Mr. Spencer Gore Browne and Mr. Alfred Morland, F.C.A., be re-elected Auditors for the ensuing year, and that their remuneration be fixed at 40 guineas each, free of tax.

Mr. Spencer seconded, and said that, if these gentlemen were re-elected, the Company would be in very good hands. He paid a tribute to both.

This motion was carried.

### Thanks to the Staff.

The Chairman proposed that a message be conveyed to the staff, both in England and India, expressing the Company's sense of obligation for their discharge of their duties in what he might say was quite an exemplary manner. It was very gratifying to include the members of the staff in India. The personnel employed was enormous for a small gas-works such as those at Bombay (the undertaking was a small one as compared with some of the gas undertakings with which Mr. Bradshaw and himself were associated) and it was very difficult for the managers—though it was very gratifying to the Directors when they accomplished it—to deal with such a heterogenous mixture of races and castes as was employed at the works. They had to select different castes for different tasks in the service of the Company; but there was one thing the Board always aimed at—and they were glad to know that they were assisted in this by the staff on the spot—and that was to give the native every possible opportunity of advancing himself, and also to give him every indulgence and compensation in misfortune, illness, or difficulty. By this means they obtained the satisfactory results which were shown by the accounts. The Company must have the hearty co-operation of all the employees, and it was only right that the meeting should express thanks to the whole staff both in England and in India.

Mr. H. H. Macleod seconded the resolution. He was certain that the shareholders felt, with the Directors, that the staff in both countries had worked exceedingly well in order to give the results obtained,

and he would like to hear something from the shareholders themselves in support of the suggestion that the staff should be thanked very sincerely for their efforts.

Mr. SPENCER supported the resolution. No one, looking at the balance-sheet, could say less than that it was an excellent one; and the result arose from the labours of the staff abroad, though, of course, he acknowledged the excellent work done by the staff in London.

Mr. W. J. LIBERTY, who also associated himself with the expression of thanks, referred to the statement in the report that no trouble had been experienced with the native workmen, though a general strike and lock-out was in progress in the cotton mills. This showed that the Manager had exercised a great deal of tact and diplomacy, because, when they realized what had taken place up and down India owing to the efforts of Ghandi and one or two others, it must have been difficult. The arrangement with regard to castes reflected great credit on the Manager and his staff. Mr. Liberty also thanked the Secretary and his staff for their efforts.

The vote of thanks was carried with enthusiasm.

Mr. A. R. BURCH (Engineer and Manager in Bombay) assured the meeting that their thanks were sincerely and heartily appreciated. In Bombay they worked under very severe climatic conditions, and sometimes, in the hot weather, the conditions were almost impossible. However, the English blood of the staff came to the fore, and they managed to worry through somehow. Their relations with the native employees were most cordial, and, from the humblest workman upwards, they had got on the right side of them. There had been a strike in 1920, and it had had to be fought out, but the men had thoroughly appreciated ever since that he was right, and that they themselves were wrong. In the recent big mill strike, which had started in January and only ended toward the end of March, the gas-works employees' sole idea was to keep out of it. They only wanted to get along peaceably and happily. He had said on other occasions when he had had the privilege of being present at these meetings, that the future of the Company in Bombay was good, and he could only confirm this more than ever on this occasion. The expansion was such that Bombay was one of the leading ports in that part of the world, and the Gas Company were bound to grow with it. Enormous areas were being developed, and the Company must follow the course of events. He assured the shareholders that they had a most excellent property; and while, of course, competition with electric light at 4d. per unit was very severe, and they might be losing consumption because of this, they were more than making it up, and would continue to do so in the future. He hoped there would be a considerable increase in the use of gas for industrial purposes, for power and heating.

A vote of thanks was accorded the Chairman for his conduct of the meeting.

This concluded the business.

## HELSTON GAS-WORKS PURCHASE.

Subject to the approval of the Ministry of Health and the ratepayers, the Helston (Cornwall) Town Council have decided to purchase the local gas undertaking for £2500. This step was taken at a meeting last week following the presentation of a report by Mr. H. H. Hoare, Manager of the Falmouth Gas Company, who made an expert valuation of the Helston Company's works on behalf of the Council. In this report Mr. Hoare estimated the value of the Company's assets at approximately £2000. He said the works had been allowed to depreciate, and that no provision had been made for future development—the latter circumstance no doubt being due to the fact that the property was leasehold with but a few years to run. Improvements and renewals must be carried out forthwith if a reasonable gas supply was to be maintained, and he estimated the cost of this work at approximately £1625. In two or three years—earlier if convenient—a gasholder of 50,000 c.ft. capacity should be erected; and this would cost approximately £2500, *plus* foundations. The whole of the undertaking required attention, and could not be carried on in its present condition through another winter. The total approximate expenditure necessary to put the works in good condition, including a purchase price of (say) £2000, he put at £7275, made up as follows: Immediate renewals £1625, new mains £500, overhauling mains and services £150, new gasholder with foundations (to be supplied later) £3000. It was mentioned that the Company's original price for the undertaking was £2900, which had been reduced to £2500 upon negotiation.

The Mayor stated that an electric lighting scheme for the town had been under discussion for some time, but after thorough investigation the Council had come to the conclusion that the cost, estimated at about £8000, was too much for a place the size of Helston. He pointed out that if the Council did not buy the gas undertaking it would be taken over by another Company who had very few shareholders in the town, whereas the Council were gas consumers to the extent of £300 per annum. He believed that an expenditure of about £1600, as recommended by Mr. Hoare, would make the undertaking a paying proposition,

After the decision to purchase the undertaking had been come to, with only one dissentient, tribute was paid to the fairness of the Gas Company throughout the negotiations.

**Gas-Works Results at Darwen.**—At a recent meeting of the Darwen Town Council, the Mayor reported a profit of £3001 on the year's work in the Gas Department. About 1400 tons less of coal had been used, and there had been increased production of gas amounting to 5,132,000 c.ft. The quantity of gas sold was 5,484,000 c.ft. more than in the previous year.

**Radcliffe Gas Profit.**—The annual report of the Radcliffe and Little Lever Joint Gas Board shows a gross profit of £23,736, and a net profit of £910, compared with £2345 last year. The gas sold exceeded previous records, but a reduction of 4d. per 1000 c.ft. had accounted for a loss of over £5000 in revenue. Having regard to the general trade depression, the Board view the year's work as satisfactory.

## SOUTH SUBURBAN GAS COMPANY'S CO-PARTNERSHIP.

### An Enjoyable Meeting at the Crystal Palace.

A first-rate variety entertainment had been arranged in the theatre of the Crystal Palace last Saturday afternoon, in connection with the annual co-partnership meeting of the South Suburban Gas Company, and it was thoroughly enjoyed by the large number of employees, with their wives and children, or their sweethearts, who were present. Subsequently the co-partnership meeting was held in the same place. The meeting was presided over by Mr. CHARLES HUNT (the Chairman of the Company), who was supported on the platform by all the other Directors, most of whom contributed to the speech-making, which was brief and to the point. The leading officials of the Company and of the co-partnership were also on the platform.

#### SUGGESTED LIFE INSURANCE.

The CHAIRMAN, on rising to make his opening remarks, was greeted with loud applause. He said he thought it was Lord Leverhulme who had proposed life insurance for workmen. If there was anything that the South Suburban Gas Company could do in this direction, he was sure the Directors would be most pleased to do it. They would be happy to further any proposal that might be put forward by the employees in order to give effect to such a scheme.

#### THE ESSENCE OF CO-PARTNERSHIP.

Sir J. FORTESCUE FLANNERY, Bart. (Deputy Chairman of the Company), thought it was an excellent thing that they should meet together at intervals, to compare notes with each other as to how they were getting on with this great system of co-partnership. When the late Sir George Livesey started this wonderful co-partnership plan, he builded better than he knew, because from the bottom of the hearts of most of them, if not of all of them, they believed that they had in the gas trade started a movement which must of necessity extend itself into the whole of the industrial system of this great country. The very essence of co-partnership was not only fraternity among themselves, but that if the enterprise in which the workers of all grades were concerned was successful, the success, and the reward of this success, should be reasonably shared by all those who had worked to obtain it. This was the essence of co-partnership, and it was that system which made for success, because he did not care how conscientious or how industrious a man might be, he would work all the more cheerfully if he knew that the reward would be partly his, as well as belonging to the others who were co-partners. This was a fundamental of human nature. Viscount Cecil had lately introduced into the House of Lords a Bill to facilitate co-partnership. It was a Bill which would enable every company to adopt co-partnership. This was a very great facility, and he believed the Bill was largely based upon data drawn up by one of the most energetic of their Directors—Col. Boraston. Thus the South Suburban Gas Company were helping-on legislation with regard to a system which he hoped would extend and be applied not merely in the gas trade, but in every industrial undertaking throughout the country. The Chairman had referred to the extension of insurance so as to include life insurance as something which could be taken into account in connection with co-partnership. At nearly every Board meeting there were cases brought up of men who wanted to retire, and happily there was a pension waiting for them according to age, length of service, &c. But supposing, instead of surviving to that period when he felt he ought to retire, a man was prematurely taken away from those who were dependent upon him—perhaps a wife and young children—this was one of the hardest and the most pathetic things. He heartily agreed as to the reasonableness of some provision being made for cases of this kind, so that there might be something waiting for the widow and the fatherless children when the breadwinner was prematurely removed by the hand of God. After nearly a quarter-of-a-century as a Director of the Company, he knew by experience the great benefit of co-partnership.

#### THE GARDEN OF INDUSTRY.

Dr. CHARLES CARPENTER remarked that he appreciated very highly the opportunity of saying a few words to them on this important occasion, though, as a matter of fact, the eloquent speech of Sir Fortescue Flannery left him very little to say. It was a good thing for them to have these meetings occasionally, because it was a fact that they had very little opportunity of coming face to face, and improving the relationship which was so deeply rooted between the management and the employees of the Company. If one read attentively the daily Press, one could not but mark the fact that the great bulk of the people in this country were living and working under conditions of discontent and dissatisfaction. The two main bodies who had striven so long to raise industry on to a higher plane—the House of Commons on the one hand, and the Trades Unions on the other—at any rate if they judged their work to-day, could not claim to have lifted the workers of this country to a plane upon which they could pass their lives in peace and contentment. The one thing in which Acts of Parliament and Trade Union orders had failed in this respect had been achieved by co-partnership. For nearly thirty years their Company had enjoyed the advantages which co-partnership had brought, and they had been many. Some of them had been indicated by the Chairman, and some by Sir Fortescue Flannery; but he himself was almost inclined to think that the greatest of them all must be that the employees had been enabled to pass their working lives in peace and contentment. People cultivated their gardens, and he supposed the greatest garden of all, the most necessary, was the garden of industry, in which all mankind had to labour, in order to work out their destiny on this earth. And unless a man could work in that garden with the same peace of mind, with the same contentment, that he did on his own little plot, the ideal, the highest ideal, of industry fell short of its possible attainment. Co-partnership had done what nothing else of which he had heard or had had experience had yet succeeded in doing. As a remedy for existing ills there had sometimes been put forward the nationalization of industry. Of the nationalization of industry there had been some experience during the war; and he did not think anyone who had had this experience would desire to see a

continuation of it. Municipalization was, perhaps, nationalization writ large. Well, the Chairman himself had had some experience of this. It was in a municipal undertaking that he found his opportunity to rise to the highest possible position as an eminent engineer and as an exponent of the principles and science of gas manufacture; but this municipal undertaking, in which so large a portion of his life was spent, gave him no opportunity for the attainment of the higher ideal of lifting up industry from the dead dreary level on which it generally existed. He found the opportunity of achieving his ambition and his desire in a Company, as Sir George Livesey did himself. Co-partnership was like a beacon in stormy seas, spreading its rays and pointing out the goal towards which the storm-tossed ships of industry must eventually make their way, manned by capital and labour, until they found in co-partnership a fair haven on the shores of which they would discover pleasant pastures and green valleys.

### The Co-Partnership Funds and Accounts.

Mr. J. Baker (Secretary of the Co Partnership Committee) then submitted the co-partnership account for the year 1923, which he said was a satisfactory one. The savings exceeded the withdrawals by £1620. The amount of bonus credited to 1407 co-partners was £10,563, being 4½ p.ct. on salaries and wages. The balances on the account amounted to £25,862. There was held by 1117 co-partners £76,948 of ordinary stock of the Company. The total sum held by co-partners in stock and on deposit, therefore, amounted to over £100,000—not including the sums standing to the credit of co-partners in the superannuation fund. He pointed out how important it was that employees who possessed more than £100 should make a will.

### The Works Committee.

Mr. F. Carter (Secretary of the Works Committee) said the Committee were doing exactly the same work, in exactly the same way, with exactly the same object as when they started in 1918. To give an idea of the volume of the work of the Committee during the past year, he pointed out that no less than 23 separate subjects were considered. They had tried their hardest to get satisfaction in every case submitted to them—to retain the confidence of the employees, and to deserve the respect and consideration of the Directors.

On the proposition of Mr. T. Anset, seconded by Mr. Alfred Pearce, the report of the Works Committee was adopted.

### The Rock of Co-Partnership.

Mr. H. Gundry declared that it gave him the utmost pleasure to come there year after year and see these magnificent meetings. Anybody who had any doubt as to the forces and power of co-partnership should be among them on these occasions. He much appreciated Dr. Carpenter's reference to co-partnership as a beacon. Taking another simile, he would say that co-partnership was like a rock. If they looked around in the industrial world, they were bound to see that there were still difficulties and quicksands, and he thought they would agree with him that co-partnership was the only rock that gave them a sound footing. He believed that only when co-partnership came into its own, and was in operation throughout the country, would they have an England that was happy, contented, and prosperous.

Col. Boraston said he was grateful to the Deputy-Chairman for having referred to the Co-Partnership Bill lately introduced into the House of Lords. He (the speaker) did have a little to do with the drafting of this Bill, and also with the drafting of the Bill during the late Government. In doing so, he was merely doing what every other member of the Board and every co-partner was doing—namely, what he could, not only in the Company but outside it, to help on co-partnership. It was a thing that was very easily helped on. He found one had only to put it fairly and intelligently in order to secure approval and strong expressions of sympathy.

Mr. W. G. Waller, as the senior representative of the employees on the Board, thanked the Directors for their kind invitation there that afternoon. He knew it gave their respected Chairman the greatest pleasure to meet them there once a year. Such gatherings as this strengthened the good feeling that already existed among co-partners. There was nothing in the wide world to-day to touch co-partnership, and he was very much surprised that more companies were not taking up the system. If they did so, a great deal of industrial misery would be abolished.

Mr. John Terrace (the Chief Engineer) appealed earnestly to them all to do everything they could to help co-partnership. The Board did all they could, and the officers of the Company did all they could to hold the balance evenly; but unless the workpeople of the Company —and he would not leave out the wives, because they had a lot to do with it—did all they could, the best results could not be achieved. They must go for a square deal, and look at the thing from the master's as well as the employee's point of view.

Mr. Morris Ingham said he felt sure the co-partners would not like to adjourn to tea before they had had an opportunity of according to the Chairman a very hearty vote of thanks for his presence there that afternoon. Once again he had proved that he had the interests of the employees at heart. It had given them very great satisfaction to hear him speak about the provision that the Directors were proposing to make for the wives and children who were sometimes left unprovided for. This was a splendid thing, which would appeal to all co-partners.

Mr. W. H. Asker, in seconding the vote, assured the Chairman that, as co-partners, they had the interests of the Company very much at heart. They appreciated greatly all that the Company were doing for them, and the remarks they had heard that afternoon regarding the goodwill of the Directors. (Loud applause.)

After the Chairman's acknowledgment of the vote, those present were entertained at high tea, which brought an enjoyable function to a close.

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**Nelson Gas Profits.**—Mr. E. J. Mitchell, Gas Engineer at Nelson, announces a profit of £14,868 on the gas-works for the past year—slightly less than the previous year. The effect of these profits is to be realized by an immediate reduction of the price of gas by 3d. per 1000 c.ft.

## NOTTINGHAM GAS UNDERTAKING.

### Profit of £165,502.

Such uniformly successful results have for a long period attended the operations of the Nottingham Corporation gas undertaking, that no surprise will be felt that the record for the past year, embodied in the report of the Committee presented at a meeting of the City Council on Monday last, indicates a further ample margin of profit, amounting to £165,502, which, though falling below the £181,367 realized in 1923, is of such substantial proportions as to allow £30,000 being allocated to the relief of rates, while making adequate provision for sinking funds, depreciation, &c. The amount to be utilized in aid of municipal burdens is the same as in each of the preceding seven years.

The Gas Committee, of which Alderman Sir Albert Ball is Chairman, state that the income for the year on the revenue account has amounted to £671,336, and the expenditure to £505,834, leaving a balance of £165,502 to be carried to the profit and loss account. To this is added £3541 representing bank interest and interest on revenue account investment, together with £49,034 brought forward from last year. After charging interest on capital, contributions to sinking funds, £15,000 for depreciation of mains, meters, and stoves, and £15,000 as a reserve for income-tax, there remains an available balance of £80,208. The Committee, having decided to allocate £30,000 as a contribution in aid of the general district rate, recommended that the balance of £50,208 be carried forward. The average price paid for coal—23s. 5·58d. per ton—showed an increase of 1s. 8·15d. per ton as compared with the previous year, while the receipts during the year for coke showed an increase of £20,557. The receipts for tar products also showed a substantial increase—viz., £24,837. Prices realized for sulphate of ammonia during the year indicated an improvement upon last year, but sales of sulphuric acid were only effected at reduced prices, and the combined receipts for ammonia products and sulphuric acid therefore showed an increase of £1798 only. The quantity of gas sold during the year was 2,650,574,300 c.ft. (12,162,728 therms), compared with 2,417,399,300 c.ft. for the previous year—an increase of 143,175,000 c.ft. The quantity of gas sold per ton of coal carbonized was 13,128 c.ft. (62·3 therms), as compared with 12,991 c.ft. last year. The number of both ordinary and prepayment meters in use continues to increase, and the average consumption of gas per meter showed an increase of 1018 c.ft. over the previous year. The Committee recommended the adoption of the following reduced scale of charges:

| | Per Therm. |
|---|---|
| For lighting and domestic cooking and heating— | |
| If the consumption be under 120 therms per quarter | 8·3 |
| If 120 therms and under 240 therms per quarter | 8·1 |
| If 240 therms and under 480 therms per quarter | 7·9 |
| If 480 therms and under 960 therms per quarter | 7·5 |
| If 960 therms and upwards per quarter | 7·3 |
| For all industrial purposes other than power— | |
| To be charged at the same rate as for lighting and domestic cooking and heating, *less* 10 p.ct. special discount. | |
| | d. |
| For power purposes— | |
| If the consumption be under 475 therms per quarter | 6·9 |
| If 475 therms and under 950 therms per quarter | 6·7 |
| If 950 therms and under 1425 therms per quarter | 6·5 |
| If 1425 therms or over per quarter | 6·3 |
| Prepayment meters— | |
| The charge for gas supplied through prepayment meters to be at the rate of 1d. for every 20 c.ft. of gas consumed | net 10·53 |

In the districts of Stoke Bardolph, Burton Joyce, Linby, Selston and Underwood, and Cotgrave, which are outside the City, the charge will be 1·26d. per therm in excess of the respective charges set out in this scale. The Committee further recommended that the rental of gas cooking stoves be reduced by one-third. This reduction will restore the rents to the pre-war basis. These reduced charges represent approximately £49,000 per annum, and it was suggested that they should come into operation from the date of the meter readings at the end of the current quarter.

### Mr. John Wilkinson's Report.

The report of Mr. John Wilkinson, the Gas Engineer and Manager, contains many interesting particulars. Mr. Wilkinson mentions that during the period under review, 192,275 tons of coal and 78,281 gallons of oil were utilized in the course of manufacturing the following products: Coal gas 2,620,853,000 c.ft. (12,449,052 therms); water gas 37,814,000 c.ft. (179,616 therms); total 2,658,667,000 c.ft. (12,628,668 therms); coke (for sale) 95,157 tons; tar, 11,680 tons; ammoniacal liquor (10 oz. strength), 26,329 tons. The water gas equalled 1·42 p.ct. of the total gas made. The following are the details of the sales of gas during the year: Ordinary consumers 1,326,745,700 c.ft., prepayment consumers 829,174,800 c.ft., power consumers 250,647,200 c.ft., gassing consumers 22,004,200 c.ft., public lamps 132,002,400 c.ft. Mr. Wilkinson points out that these figures indicate an increase of 143,175,000 c.ft., or 5·92 p.ct., when compared with the sale of gas for the previous year. The gas unaccounted for during the year was 98,092,700 c.ft., or 3·69 p.ct., as compared with 4·18 p.ct. for the previous year. The sale of gas per ton of coal carbonized was 13,128 c.ft. (62·3 therms), as compared with 12,991 c.ft. for the previous year.

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**Newcastle (Staffs) Gas Affairs.**—Mr. Elijah Hollins, who has been appointed Chairman of the Newcastle Gas Committee, in succession to Alderman G. Scott, is Chairman of Directors of Messrs. Geo. Hollins and Sons, Ltd., of Newcastle, Stoke, and Wolstanton. He has been Vice-Chairman of the Committee since November, 1922. Since 1922 the price of gas has been reduced from 5s. to 3s. 9d. per 1000 c.ft. A loss in 1921 was turned into a profit in 1922, and there was a further profit in 1923, in spite of the decrease in price.

## WIRKSWORTH GAS ORDER.

An application by the Wirksworth Gas Light and Coke Company for an Order under section 10 of the Gas Regulation Act was the subject of an inquiry by Mr. H. C. HONEY (Director of Gas Administration at the Board of Trade), at the offices of the Board, on Friday, May 2. By this Order the Company, who have been supplying gas in the Urban District of Wirksworth (Derbyshire) for about 90 years as a private concern, seek statutory powers to continue the supply, and to extend their limits to include the parish of Middleton-by-Wirksworth. They also seek power to raise further capital, to fix a maximum price of 8s. per 1000 c.ft., and embody in the Order a number of usual clauses with regard to maintenance of gas-works, laying of mains, &c.

There was opposition by the Wirksworth Urban District Council with regard to the maximum price asked for, the mode of issuing capital, the amount of additional capital required, the laying of pipes in private streets, liability for damage to mains, and the stand-by clause. The Hopton-Wood Stone Firms, Ltd., who have been supplying gas in Middleton for many years, and are still supplying, opposed the extension of the Company's limits; but this matter was settled eventually on the Wirksworth Company's offering a clause which would facilitate negotiations for the purchase of the gas undertaking of the Hopton-Wood Company. The Derbyshire County Council opposed also with regard to the position of, and damage to, mains in county roads.

The Wirksworth Company were represented by Mr. J. B. ASPINALL; the Wirksworth Urban District Council by Mr. R. J. SUTCLIFFE, the Hopton-Wood Company by Mr. C. W. TURNER, and the Derbyshire County Council by Mr. C. D. MARSHALL (Messrs. Lewin, Gregory & Co., Parliamentary Agents).

Mr. J. B. ASPINALL, opening for the Wirksworth Gas Company, said the present area of supply comprised about 3000 acres of hilly and rocky country. Describing the origin of the Company, he said it was formed as the result of a public meeting held in Wirksworth in 1835 for the purpose of considering the expediency of forming a company to light the town with gas, it being resolved at that meeting that the formation of a company would be highly advantageous to the inhabitants. In 1838 the Company was constituted by a deed of settlement, and in 1865 was incorporated as a limited company under the Companies' Act of 1862. The capital was £5000, divided into 500 shares of £10 each, which were all issued and fully paid; and in 1902 they created a series of £25 first mortgage debentures securing a total amount of £4000, bearing interest at 4 p.ct. Of these, 140 had been issued, amounting to £3500. The Company, said Counsel, had conducted operations on perfectly good terms with the neighbourhood for many years. The Parish of Middleton, which it was sought to include within the limits of supply, was at present supplied by private undertakers whose real function was not to supply gas at all. Discussing the working of the Wirksworth Company for the past twenty years, he said that since 1903 the mean price of gas per 1000 c.ft. was ordinarily 4s. 5d., and for power 3s. 8d. The gross revenue per annum was round about £2000, and the dividend remained between 8 and 9 p.ct. until 1915. He gave figures of gross revenue and dividends from then until 1922, which showed that gross revenue was higher, but that dividends were lower, being as low as 2 p.ct. in 1919, while there was no dividend at all in 1921. In 1922 the dividend paid was 5 p.ct. They were now recovering from the recent depression. There were two factors which had led the Company to seek statutory powers. First, there had been certain difficulties with the Wirksworth Urban District Council, which he hoped would be removed, and secondly—a far more serious matter—the Derbyshire and Nottinghamshire Electric Power Company were seeking power to distribute electricity within the Urban District. Therefore, the Company felt that their existence might very well be at stake unless they obtained statutory powers, which would afford them a quota of protection in the competition which was likely to arise.

Mr. *Edward Moore* (Manager and Secretary of the Gas Company) then gave evidence, and dealt with the powers which it was sought by the Order to obtain. He said that originally there was opposition from the London, Midland, and Scottish Railway Company, with regard to pipes between mains and meters; but a clause was inserted for their protection in the terms of section 33 of the Gas Light and Coke Company's Order of 1922 in the form usually adopted in these Orders for the protection of railway companies. The present charge for gas by the Wirksworth Gas Company was 6s. 8d. per 1000 c.ft., and the charge in Middleton by the Hopton-Wood Stone Firms, Ltd., was 7s. 3d. The supply in Middleton had not been of the best, and he was of opinion that if the Gas Company were given power to supply in Middleton they would be able to give a better supply and could ensure its being continuous. He had no information as to whether the Hopton-Wood Company were likely to discontinue the supply, but there was a probability of their taking electricity for lighting at their works; whereas, if the Gas Company were given power to supply, the inhabitants would be in a position to demand it.

The additional capital it was desired to raise was £5000, with borrowing powers up to half the amount of capital issued. With regard to a clause providing that the new shares or stock were to be sold by auction or tender, it was provided that notice of the intended sale should be given to the Clerk of each district within the limits of supply, and to the Secretary of the London Stock Exchange, at least fourteen days before the day of auction or the last day for the reception of tenders. The Wirksworth Urban District Council asked for the period to be extended to 28 days, because it would give those receiving notices a more reasonable opportunity of considering the matter. It having been pointed out by Mr. Honey, however, that this period was sometimes reduced to seven days, and that a period of twenty-eight days might be against the interests of the Urban District Council, because the market might have gone by that time, it was agreed to accept the period of fourteen days.

Another clause in the Order contained power to offer capital for subscription by the public, with the consent of the Board of Trade. The Urban District Council considered that this clause was not appropriate, having in view the small amount of capital involved; but witness pointed out that the shares of a company in such a district were not attractive to anybody outside the area, and this was the reason the powers were asked for. The families responsible for the Company had taken a family interest in it. Before the war, the Directors' fees had amounted to £15 per annum, divided between seven of them, but this amount had been doubled since the war. The standard dividends were set out in the Order as 10 p.ct. on the original capital, 7 p.ct. on the new ordinary, and 6 p.ct. on the preference. Interest on borrowed money was limited to 6 p.ct. The maximum price for gas was put at 8s. per 1000 c.ft., to be converted to 19·2d. per therm when the calorific value was declared and supplied. The Urban District Council regarded this price as too high, but, taking into consideration possible increases in the cost of coal and labour, it was reasonable, because, being a small undertaking, they were naturally very sensitive to increased costs of production. The clause provided for revision of the price by the Board of Trade if the cost of supply altered owing to circumstances beyond the control of the Company. The Urban District Council asked for the insertion of a provision authorizing the Board of Trade to revise the price, if satisfied that the costs of supply should have been reduced by reason of circumstances of which the Company might reasonably have taken advantage, or by reason of economies which the Company might have effected with due care and management. Another clause provided for the substitution of a standard for the maximum price after three years, if the Board of Trade thought fit. A clause in the Order empowered the Company to lay mains and supply gas to consumers in private streets, on the application of the owner or occupier of the premises, and the Urban District Council asked for a proviso that a local authority should be deemed to be persons having the control or management of any street within their area to which this section applied. Mr. Sutcliffe said that such a proviso was fairly common, and was included in the Barnsley Gas Order, 1923. It was desirable, he said, because the owner of such a street, before it was taken over by the local authority, did not care a great deal about the position of the pipes; but the local authority ought to be interested, because the street would ultimately become vested in the local authority. The Company considered this unreasonable. The District Council were not asking for control of private streets, but merely that they should be persons interested, so that when gas-pipes were laid they might have something to do with it, in view of the fact that they would have other works there.

Mr. ASPINALL said that the District Council would be, in fact, interferring with private property.

Mr. SUTCLIFFE said they would, but only to the extent of saying where the pipes were to be laid. Another precedent for this proviso was the Torquay Order of 1923. With regard to the stand-by clause, this was in the usual form, and the minimum sum charged per quarter for a stand-by supply to business premises was not to exceed 25s. The District Council asked for a proviso that, in respect of premises for which the whole supply of gas afforded by the Company was taken through a No. 3 standard meter or a nominal 10-light meter, the amount of the minimum charge should not exceed 5s. for any quarter. Mr. Sutcliffe gave the Barnsley and Lytham-St. Anne's Orders as precedents.

Mr. *Moore* did not see the point of specifying a certain size of meter. The circumstances in each case would be considered, and it was better that the Company should not be tied down to certain sizes of meter. There were only about four consumers who would be affected by it.

Mr. SUTCLIFFE said it was desired to protect owners of small premises, such as lock-up shops, because in some cases, if the Company were allowed to charge 25s. per quarter, this would exceed the cost of the gas consumed.

Mr. ASPINALL pointed out that, if the Company charged too much, the owners of the premises would not keep the stand-by at all.

In the Order as originally drafted there was the usual clause providing that the Company should not be obliged to give a supply of gas other than for lighting or domestic use from mains of insufficient capacity. This was deleted to meet the opposition of the London, Midland, and Scottish Railway Company, while there was also some objection by the Urban District Council. If a clause were agreed between the railway companies and the National Gas Council on this matter, the Company reserved the right to have it inserted in the Order. The Urban District Council agreed to this course.

The usual clause was inserted with regard to the supply to or by the Company of gas in bulk, and, at the instance of the Urban District Council a proviso was inserted preventing the Company from supplying in bulk beyond the limits of supply, if it interfered with the supply within the limits.

Witness was then subjected to a long cross-examination by Mr. Sutcliffe, who examined in some detail the revenue accounts of the Company, his point being that in every year except 1917 and 1923 the dividend was paid without deducting income-tax. Therefore, the dividends were actually higher than the accounts appeared to indicate, and this supported his contention that the suggested maximum price of 8s. was too high. Witness replied that the tax had been deducted every year since 1917. Mr. Sutcliffe also put questions with regard to the amounts charged for depreciation and the method in which this was charged in the accounts, and suggested that the Company could have paid larger dividends. Mr. Aspinall interpolated the remark that the dividends would have been higher if they had paid no wages.

In the course of further questions with regard to the cost of supply of gas, it was stated that the net cost of gas in 1923 was 5s. 0·2d. per 1000 c.ft.; and Mr. Sutcliffe said that the Company were asking, in effect, for a surplus of 3s. per 1000 c.ft. Mr. Honey said that the net cost did not include capital charges, but Counsel pointed out that, on the other hand, depreciation at 5½d. was included in the 5s. 0·2d., and after deducting this the net cost would be 4s. 6·7d. He also got from witness that provision would be made for supplying 14 or 15 million c.ft. per annum, instead of the present 8 or 9 millions, and suggested that this increased output would also tend to reduce costs. Witness, in reply, pointed to the increased cost of coal, and said it had cost more during the past six months than on the average for last year.

As to the additional capital and borrowing powers, amounting in all to £6500, Counsel got from witness the view that £5000 would be sufficient to meet the expenditure necessary for the next ten years.

Therefore, he suggested that the additional capital asked for was too much. With regard to the proviso as to the laying of mains in private streets, witness said there were only three such streets, and they had laid mains in two of them. Counsel pointed out, however, that the clause might apply to streets made in the future.

There was some discussion as to the form of stand-by clause to be adopted, Mr. Aspinall suggesting that the Urban District Council might be satisfied with the clause in the Brierley Hill Order, 1924, which provided that if there were a dispute it should be settled by arbitration. Mr. Sutcliffe would not accept this, because small consumers, whom he wished particularly to protect, were prohibited, by considerations of cost, from going to arbitration when overcharged, and, therefore, had no remedy. The matter was left in Mr. Honey's hands. He pointed out that, as recently as 1922, Parliament, by general Act, had given this arbitration clause to electricity undertakers. This being so, it must be assumed that it was a fair clause for gas undertakers as well, and the Brierley Hill clause was in the same terms.

Witness was then cross-examined by Mr. C. W. Turner (for the Hopton-Wood Stone Firms, Ltd.), who suggested that it would be unfair for the Wirksworth Company to supply in Middleton, having in view the fact that the Hopton-Wood Company were already there, unless they purchased the latter Company's undertaking. Witness said it would not be worth doing otherwise. Mr. Turner said he was willing for the Wirksworth Company to purchase the Hopton-Wood Company's gas undertaking.

After some discussion, Mr. Honey suggested that a clause might be included (on the lines of a clause in the Hemel Hempsted District Gas Act of 1917), which would give the Wirksworth Company power to purchase gas mains and apparatus in Middleton, and to supply there under the same conditions as in Wirksworth, but only with the consent of the proprietors of the gas undertaking in Middleton. Mr. Aspinall said it would be unreasonable for him to object to a clause on those lines, and Mr. Turner agreed that it was a very convenient way of leading to negotiations for purchase. One or two difficulties were suggested, but these were merely drafting matters, and the parties agreed to bring forward a clause on the lines suggested, and containing a proviso that, if the Hopton-Wood Company discontinued the supply in Middleton, there should then be no obligation on the Wirksworth Company to obtain their consent.

Major *C. B. Symonds* (Chairman of the Wirksworth Gas Company) then gave evidence as to the reasonableness of the additional capital asked for. He pointed out that the Company had to keep pace with modern conditions, and shortly would have to compete with electricity. The consumers had been supplied with gas at practically cost price since the Company was formed, and the price would remain the same whether the 8s. maximum were granted or not.

Some discussion arose as to the depth of mains in streets, the Urban District Council asking for provisions relieving them from liability in the event of damage to the Company's mains by steam rollers and other vehicles used in the repair of roads. Major Symonds said there was a peculiar difficulty in the district with regard to laying mains, because the rock came very near the surface, and pipes could only be laid by carrying-out excavations. He would not say that damage caused in the past had been the result of negligence on the part of the Council, but the result of the absence of a certain amount of care in breaking up the subsoil. He also pointed out that the weight of steam rollers had increased. The pipes were laid sufficiently deep originally to meet the circumstances at that time.

In cross-examination, Mr. Sutcliffe said that in two cases the surface level of roads had been raised because the gas-mains were exposed, and these mains were not more than 6 in. below the surface at present. Clause 20 of the Gas-Works (Clauses) Act, 1847, provided that any persons damaging a pipe were liable to pay compensation up to £5; and he suggested it was unfair that this section should be applied when some pipes were within 6 in. of the surface, as requested by the Company. He pointed out that, in the case of one particular road, an agreement was entered into between the Company and the Urban District Council, by which the Company were to lay a main at a certain depth, to be agreed with or specified by the Urban District Council, and that the latter should not be liable for damage done by steam rollers in that road. This was what the Urban District Council asked for in this Order. Witness could not agree to a clause relieving the Urban District Council of liability with regard to existing mains, but there might be a chance of agreeing with regard to mains to be laid in future.

Mr. C. D. MARSHALL, for the Derbyshire County Council, then questioned Major Symonds at some length with regard to an agreement entered into between the County Council and the Gas Company in 1915, which contained a paragraph somewhat similar to that contained in the Company's agreement with the Urban District Council, already referred to, and handed-in a clause which purported to reproduce the terms of that paragraph, which he suggested should be inserted in the Order for the protection of the County Council.

Mr. ASPINALL would not accept the clause as a whole, but the result of the discussion on it was an agreement that pipes to be laid in roads under the jurisdiction of the County Council should be laid at depths to be reasonably agreed by the County Surveyor, and that the County Council should not be liable for damage done by their steam rollers on roads repairable by the County Council. The part of the clause which Mr. Aspinall would not accept provided that where, owing to the reconstruction of roads, pipes had to be moved, the cost should be recovered by the County Council from the Gas Company.

Mr. HONEY said that this part of the clause involved an alteration of the general law, not only as regards a particular class of undertaking, but a particular undertaking in that class; and if the County Council wanted an alteration of the general law of this kind, they must get it in a different way.

When Mr. Sutcliffe intimated that the Urban District Council would be prepared to accept the provision given to the County Council in regard to roads, Mr. Aspinall said he was not prepared to concede it.

Mr. *H. Hopkins* (Engineer, Surveyor, and Sanitary Inspector to the Wirksworth Urban District Council) expressed the opinion that the existing mains of the Company as laid under main roads and district roads were at a depth insufficient for the class of traffic carried. He referred to the two occasions on which the gas-mains had been exposed, and said it was more expedient to raise the level of the roads in those cases than it would have been to have gone to the expense of relaying the mains. When he was repairing a stretch in the centre of the town recently, the Gas Company had immediately hacked-up the road in four places, in order to repair breakages to mains. The maximum depth there was 18 in. It was difficult to avoid breaking mains with the type of roller which an engineer would ordinarily use to-day.

Mr. ASPINALL cross-examined, and made his point that the mains were at a sufficient depth when laid, and that the altered circumstances were brought about by the altered nature of the roads, and the increasingly heavy steam rollers.

*Witness* said that a gas company should be responsible for the maintenance of their mains, just as a water company were.

Mr. SUTCLIFFE, addressing Mr. Honey, said that the Company, in asking for statutory powers, were asking that the present position of the Urban District Council should be altered, because at present, if the Company sued the Urban District Council in respect of damage to their mains, they would have to show that the latter body had broken them by negligence, whereas, if granted the Order, they would be entitled to claim compensation for mains broken "carelessly or accidentally," up to £5, by virtue of section 20 of the Gas-Works (Clauses) Act, 1847. He submitted that this section was intended to apply to companies asking for statutory powers for works which they were about to carry out, and was never intended to be incorporated in an Order asked for by companies operating on works already laid down. He merely asked for the protection the Company were ready to give to the County Council, and for a principle contained in the agreement already existing in respect to a particular length of road where the Company were about to lay mains. The Company were now asking for that to be abrogated in respect of the small length.

The Urban District Council, he said, attached great importance to the maximum price asked for. The Company had put away approximately £200 per annum for depreciation in recent years, and, in addition, in the items of fittings and repairs they had included maintenance of plant and works. If that £200 per annum were applied to dividends, they could have paid a further 4 p.ct.

Mr. HONEY thought that, if they had done this, the Urban District Council would have said they were distinctly extravagant.

Continuing, Mr. SUTCLIFFE said the net cost of gas, deducting depreciation, was 4s. 6·7d. per 1000 c.ft. The Matlock Bath undertaking, which supplied an adjoining area, sold at 5s. and had a maximum of 5s. 6d., and he submitted that a maximum somewhat approximating to this would be sufficient for the Wirksworth Company. When a company asked for statutory authority they ought to put their house in order, and supply on a reasonable maximum charge. As to the revision of the maximum price, he said there seemed to have been some omission in the provisions of the Gas Regulation Act in this respect. It provided only for revision upward, and it should be altered so that, if costs could be reduced by circumstances which the Directors could reasonably take advantage of, a local authority should have the right to ask for a revision of the price downwards.

Mr. HONEY said he would be very reluctant to alter the wording of the Gas Regulation Act by a clause in the Order, to make it clear that the intention of the Act was that a reduction of the standard or maximum price might be made. Directly they did this they threw a great deal of doubt on the powers of the Board of Trade under the Gas Regulation Act. The London County Council had been content to rely upon the terms of the Act, and had got what they wanted in regard to the revision of standard prices. If it was good enough for the London County Council, it was good enough for Wirksworth.

In reply to this, Mr. Sutcliffe was about to put forward a suggestion to which the Company might agree, but Mr. Aspinall said he was going to encourage the Administrator in his reluctance. However, an alteration to the proviso to the clause asked for by the Urban District Council is to be submitted.

## Metrogas Operatic Society.

A recent addition to the South Metropolitan Gas Company's employees' numerous social institutions is the "Metrogas Operatic Society," who gave their first show on Thursday, Friday, and Saturday of last week; the production being "The Mikado," by permission of Mr. R. D'Oyly Carte. The performances took place in the Co-Partnership Institute at the East Greenwich Gas-Works; the large hall being filled with an appreciative audience on each occasion. Apart from the scenery, costumes, and wigs (which were supplied by well-known firms in the theatrical world), the whole production was the work of the employees of the Company. The staging left nothing to be desired; and without singling out for special mention any particular member of the caste, it must be admitted that the rendering throughout was highly commendable. Well-merited praise must also be accorded the Company's orchestra and its Musical Director. Whatever the Society's subsequent productions may be, the members are to be congratulated on the unqualified success which attended its first efforts.

**Extensions at Walsall.**—The Walsall Gas Committee are recommending to the Town Council in favour of the erection of seven beds of horizontal retorts at the Pleck Gas-Works, at an estimated cost of £22,000. Only a few years ago the Council sanctioned an expenditure of over £30,000 for the provision of vertical retorts. Extensions of the gas-mains in the new Ring Road area are contemplated, at a probable cost of £2900.

**London County Council and Gas Lighting of Schools.**—The London County Council Education Committee have accepted tenders from the Gas Light and Coke Company, the South Metropolitan Gas Company, the Commercial Gas Company, and Messrs. W. Sugg & Co., Ltd., for improving the gas lighting at twenty-six schools under their authority. They have also authorized the invitation of quotations from the Gas Light and Coke Company and the South Metropolitan Gas Company for improving the gas lighting at nineteen other schools.

## THE GAS INDUSTRY AND THE LONDON ELECTRICITY INQUIRY.

After their unfortunate experience in the Courts last year, where they were taken by the London electricity supply companies on a point of law, the Electricity Commissioners have been sitting since Monday, May 5, in a third attempt to solve the undoubtedly difficult problem of London's electricity supply. Their troubles, of course, are all due to the fact that the early legislation of 1882 and 1888 created such a host of vested interests, the rights of which even the best of well-meaning Electricity Commissioners cannot sweep away. Thus the trouble has been to frame a scheme which, while effecting what are generally agreed to be necessary reforms in the whole scheme of electricity supply in the metropolitan area, will not introduce anything in the nature of compulsion upon any of the parties concerned. The gas industry, of course, is not directly concerned in the scheme as such, but it took a direct part in the proceedings on Friday, May 9, in connection with one clause, to which reference is made below. There is also a passing interest inasmuch as the attempt which is being made to arrive at a settlement of the purchase difficulty—the London County Council have the right of purchase of all the electric supply companies of the County of London in 1931—involves a scheme for the adjustment of dividends with prices, well known in the gas industry as the sliding-scale. Indeed, Mr. W. Cash, a familiar figure in connection with gas legislation and private bills, has been advising the London County Council on the matter, and Mr. W. B. Keen, another well-known figure in the Parliamentary Committee Rooms, has been advising some of the companies. The scheme adopted is for a sliding-scale in which the slide operates in one direction only—viz., there is to be a minimum dividend, and the slide will operate to the benefit of the consumers and the company only after that minimum dividend has been paid. In other words, the companies will be assured of a reasonable dividend (the County of London suggests it is too generous, but this by the way) in any event. This is based on the South Metropolitan Gas Act of 1921—the first to contain such a sliding-scale, though others have followed since. All this is a matter of general interest to the gas industry.

The scheme which the Commissioners have now propounded is comprised in a document consisting of the Order proper, two long schedules, and four annexes; and it was in connection with one of the clauses in one of the schedules that the gas industry took a directly active part in the proceedings, and, it may at once be added, an entirely successful one. The point was argued on behalf of the South Metropolitan Gas Company, and the National Gas Council also appeared on the same matter.

Mr. W. A. JOWITT, K.C., M.P., who appeared with Mr. Lloyd for the South Metropolitan Gas Company, raised an objection to Clause 6 of the fourth annex to the Order, which is in the following terms:

> 6.—(1) The Joint Authority may, within the district, lay down, maintain, repair, alter, and use pipes for conveying water, gas, or any materials, matters, or things used by them in or resulting from the process of generating or transforming electricity, or from any generating station of the Joint Authority; and the provisions of the Waterworks Clauses Act, 1847, with respect to the breaking-up of streets for the purpose of laying pipes shall so far as applicable extend and apply to the laying-down, repairing, altering, or removing of pipes for such purposes; but nothing contained in this paragraph shall authorize the Joint Authority to supply water or gas to other persons within or for use within the statutory limits of supply of any company or authority supplying water or gas.
>
> (2) Where any pipe to be laid by the Joint Authority under this paragraph crosses over or under or is situate within 3 ft. of any mains, pipes, or other works of any company or authority supplying water or gas, that pipe shall be laid down under the superintendence and to the reasonable satisfaction of the engineer of that company or authority.
>
> (3) The provisions of section 16 of the schedule to the Electric Lighting Clauses Act, 1899, shall apply to the breaking-up of any street under the powers of this paragraph, and for the purposes of such application the expression "Principal Act" in that section shall be deemed to mean the Waterworks Clauses Act, 1847.

Mr. JOWITT said he was desirous of assisting the Commissioners to come to a satisfactory solution of this matter, and they would find him, and those who were acting with him, prepared to go as far as possible to eliminate the difficulty which he had referred to, which was a small matter compared with the scheme as a whole, but which, nevertheless, was one which vitally affected the South Metropolitan Gas Company. He was bound to say definitely that, in his view, this clause to the fourth annex was *ultra vires*. Though the ultimate decision as to whether it was or was not *ultra vires* did not rest with the Commissioners, nevertheless, as a matter of business, it would not be a waste of time if he indicated his reasons for saying that this was so; and he suggested an amendment which would get over the difficulty, and would at the same time give the Joint Electricity Authority all the powers it could reasonably or, indeed, possibly require. In making a few remarks on the matter now, however, he did not wish it understood that he was in any way waiving his rights to contend elsewhere that the clause was *ultra vires*. His object was that it seemed to him possible to deal with the problem as a business matter, and prevent holding-up the scheme still further.

In reviewing the present position of the law in regard to the matters dealt with in the Clause set out above, Mr. Jowitt said it was true that in a number of cases dealing with electric power companies, such as the Cleveland and Durham, Derbyshire, Yorkshire, Cornwall, Gloucester, Leicester, North Western, Somerset, North Wales, County of Durham, Cumberland, Kent, Lancashire, and Central Ireland, the legislature had included express provisions analogous to those contained in Clause 6 of the fourth annex; but in all the cases he had mentioned, the Acts of Parliament were passed before the Electricity Supply Act of 1919. Therefore, it was possible to conceive that in framing the Electricity Supply Act of 1919, the legislature must have had in mind the possibility of inserting in that Act provisions similar to those in the Power Acts previously passed. But what did they find? In section 15 (2) of the Electricity Supply Act of 1919, the following appeared:

> (2) A joint electricity authority and any local authority, company, or person may, with the consent of the Electricity Commissioners, enter into arrangements for the utilization, for the purposes of the Joint Electricity Authority, of water power, waste heat, or other form of energy which the local authority, company, or person may be able to dispose of, or for the supply by the joint authority of any form of energy other than electricity, and, where such an arrangement has been made, the joint electricity authority may be authorized by Order to exercise such powers (including the power to break-up roads, railways, and tramways) as may be necessary for the purpose of conveying such energy: Provided always that such joint electricity authority, local authority, company, or person shall in no case have the power to enter into arrangements for the supply by the joint electricity authority of any form of energy other than electricity in any area or district within which any undertakers may be authorized by Parliament to supply such form of energy, unless and until such undertakers consent thereto, and then only upon such terms and conditions as may be agreed upon with such undertakers.

The framework of this, continued Mr. Jowitt, indicated plainly that first there must be, so to speak, a person who had a surplus stock of energy on the one hand, and, on the other hand, a person who wanted that supply, and that these two parties should come to an arrangement, which could be submitted for the Commissioners' approval. Under the 1919 Act, the Commissioners were clearly entitled to put into Clause 6 of the fourth annex powers for the Joint Authority to break-up roads, though it was unnecessary to do so in this Order; but Clause 6 of the present Order went much further than this. It conferred powers upon a body not yet formed, and it struck out the provision of the Act of 1919, which provided that there must be two parties who had come to an agreement, the one to supply and the other to take surplus energy. Under Clause 6 as it stood, there was nothing to prevent the Joint Electricity Authority from setting up its own gas-works, supplying their own electricity works, and breaking-up streets for laying mains, without the approval of anybody. The whole of the necessity, under the 1919 Act, for obtaining an Order had been struck out, and in effect the Commissioners had washed their hands of all responsibility, and told the Joint Authority it could do as it pleased. There was nothing which could prevent the Joint Electricity Authority from running pipes through the area of the South Metropolitan Gas Company, to supply somebody on the other side. He knew, of course, that the Commissioners did not intend that this should be the case, but he was pointing out the legal circumstances in which it could be done, and that the powers of Clause 6 were very much wider than need be the case. In these circumstances, he was going to be bold enough to suggest an amendment which would meet his clients, and at the same time, he ventured to think, would not take away from the Joint Electricity Authority any powers which it was desirable that it should possess. He therefore proposed that after the word "conveying" in the early part of Clause 6 of the fourth annex, the following words should be added in substitution for the words "Joint Authority" a few lines lower: " . . . conveying energy in pursuance of any arrangement entered into under the provisions of section 15 (2) of the Electricity Supply Act, 1919;" the clause then continuing "and the provisions of the Waterworks Clauses Act, 1847 . . ."

The Commissioners conferred on the point raised, and the CHAIRMAN stated there was some misapprehension over the matter, and probably Mr. Jowitt was right in the construction which he had put upon the clause. It was not the intention of the Commissioners to enable the Joint Authority to lay pipes for the transference of energy. The real purpose was to allow the Joint Authority to lay pipes for condensing and circulating water purposes and the like; and until attention had been drawn to the possible construction to be placed upon the clause, it had not been regarded as having any other meaning. Therefore, having regard to the provisions of section 15 (2) of the Electric Lighting Act of 1919, to which Mr. Jowitt had called attention, the Commissioners were prepared to withdraw the whole of Clause 6 from the fourth annex, not because they thought that this would facilitate the passage of the Order, but on the merits; and at the same time they thanked Mr. Jowitt for bringing the matter forward.

Mr. BEVERIDGE, for the National Gas Council, said that this decision covered the point he was going to raise, and his opposition would therefore be withdrawn.

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**Carnarvon Gas Profits.**—A report of the Carnarvon Corporation Gas Committee shows the net profit for 1923-24 on the gas undertaking to have been £322.

**Nail Causes Fatal Gas Leak.**—"Accidental death from gas poisoning" was the verdict at an inquest on the body of James Hetherington (aged 87), of Bangor (Co. Down), who was found seated in his house in an unconscious condition. It appears that a nail which had been driven into a wall to hold up an almanack had penetrated a gas-pipe, thus causing a leakage. Deceased's wife, who was an invalid in bed, was also unconscious.

**Torch Lighting Gas Economy.**—The Northfleet Urban District Council have received a letter from the Gravesend Gas Company agreeing to a reduction of 2s. 6d. per lamp per annum suggested by the Council for the saving to be effected by torch lighting instead of by-pass lighting, in respect of the lamps in the Council's district supplied by them with gas but maintained on the Council's behalf by the Northfleet Company—such reduction to take effect so soon as the Northfleet Company have converted the lamps.

**Oldbury Tar-Works Fatality.**—Thrilling stories of attempts at rescue were related at Oldbury on Wednesday last week at the inquest—at which a verdict of "accidental death" was returned—on two men who met their deaths at the Oldbury Works of the Midland Tar Distillery, Ltd., on April 14; the victims being Walter Heap and George Challis. The Jury expressed their appreciation of the conduct of two workmen, Hebberts and Challis, and hoped that Hebberts' bravery would be brought to the notice of the Royal Humane Society and the Carnegie Hero Fund.

## GAS REGULATION ACT APPLICATION.

There has appeared in the "London Gazette" the following further notice regarding an application to the Board of Trade under the Gas Regulation Act.

**SPECIAL ORDER.**

**Gloucester Gas Light Company.**

Application is to be made by the Company to the Board of Trade for a Special Order under section 10 of the Act to empower them to hold annual meetings, to make provisions regarding premises using other gas or electricity, to amend obligations as to supply of gas, and to create a renewal fund.

## GAS REGULATION ACT ORDERS.

We have received from the Director of Gas Administration a copy of the following further Orders made by the Board of Trade under section 1 of the Gas Regulation Act.

**Manchester Corporation.**

After the declared date, the maximum price in respect of gas supplied by the undertakers shall be 13·3d. per therm. (May 7.)

**Peebles Corporation.**

The Order is in the usual terms, but with no price figure inserted. (May 8.)

**Renfrew Corporation.**

After the declared date, the price of 17·3d. per therm shall be substituted for the price of 6s. 6d. per 1000 c.ft. mentioned in section XXXVIII. (powers to be exercised by lessee) of the Renfrew Police and Improvement Act, 1855. (May 5.)

## CITY AND GUILDS OF LONDON INSTITUTE.

The following questions were set in the City and Guilds of London Institute Examinations in the subjects named. The questions in the examination on Coke and Bye-Products Manufacture were published in last week's "JOURNAL" (p. 411).

**Gas Engineering.**

Examiner: Mr. S. TAGG.

GRADE I.

(*The maximum number of marks is affixed to each question.*)

1. Give a cross-sectional sketch of a regenerative setting of horizontal retorts. (45.)
2. Describe the method of heating the above setting from cold, and the control required to maintain the heats. (45.)
3. Describe with the aid of sketches the construction of a hydraulic main. (35.)
4. Give a list of the impurities present in crude gas, and state how these are removed. (35.)
5. Sketch and give figured dimensions of oxide purifiers for the treatment of a make of 100,000 c.ft. of gas per hour. (35.)
6. Describe a method for the complete analysis of purified gas. (35.)
7. Give a description of the apparatus required and the method employed for the determination of the calorific value of gas. (35.)
8. Describe with the aid of sketches the construction of a station governor. (35.)
9. Describe the construction of a dry gas-meter. (30.)
10. What are the advantages of high-pressure lighting? (30.)

FINAL.

1. Describe with the aid of sketches the construction of a regenerative setting of horizontal retorts. (45.)
2. Describe the method of working vertical retorts, and state the temperature maintained in each combustion chamber, the rate of throughput of coal, and the volume and calorific value of gas obtained. (45.)
3. Discuss the advantages and disadvantages of mechanical coal and coke handling plant and stoking machines as compared with hand labour. (35.)
4. Give sketches showing the construction of a carburetted water-gas plant. (35.)
5. Describe the whole of the plant required for the removal of ammonia. (35.)
6. Describe with the aid of sketches the construction and method of working plant for the manufacture of sulphate of ammonia. (35.)
7. What factors would you take into consideration in determining the calorific value to be declared under the Gas Regulation Act? (35.)
8. Describe a method for determining the amount of ammonia and sulphuretted hydrogen in crude coal gas, giving sketches of the apparatus required. (35.)
9. Describe the construction and working of a station meter. (30.)
10. Compare the efficiencies of gas and electricity for lighting, heating, and power. (30.)

**Gas Fitting.**

Chief Examiner: Mr. R. J. Rogers.

GRADE II.—WRITTEN.

(*Not more than six questions to be attempted.*)

1. Which do you prefer to use for general gasfitting work, (*a*) iron barrel pipe, (*b*) composition pipe, or (*c*) lead pipe? State fully your reasons, naming the advantages and disadvantages of each kind of pipe. (50.)
2. When the gas supply is turned on to a gas-cooker, the lights in the house are lowered. To what do you attribute the cause, and how would you remedy matters. (40.)
3. In carcassing a dwelling house, you are instructed to run (*a*) a 1-in. iron rising supply pipe for lighting and other requirements on the first floor, and (*b*) a separate ¾-in. pipe from the meter to supply a cooker and wash boiler on the ground floor. Describe with the aid of a sketch exactly how you would make your connections for supplies (*a*) and (*b*) at the outlet of the meter, and indicate the fittings that you would use. (60.)
4. In what circumstances would you use a governor on the outlet of a meter? State what, in your opinion, are the advantages and disadvantages of using a governor. (40.)
5. What do you understand by the following terms: Conduction, radiation, convection, calorific value, B.Th.U., therm? (50.)
6. A living room 17 ft. by 14 ft. by 10 ft. high is required to be heated by a gas-fire. The room contains a bay window 6 ft. by 5 ft. facing south. State (*a*) the size (in radiants) and type of fire that you would fix; (*b*) the hourly gas consumption of the fire; (*c*) the size of supply pipe required; (*d*) the cost per hour with gas at 8d. per therm (C.V. of gas = 500 B.Th.U.). (50.)
7. Explain fully the meaning of the following terms used in connection with gaslighting fittings: Brazed tube, solid drawn tube, hard soldered joints, soft soldered joints. What class of tube should be used in the manufacture of gasfittings? State your reasons. (50.)
8. The burner on a gas-cooker hotplate, when a kettle is placed thereon, gives off a smell. What is the reason for this, and how would you remedy it? (40.)
9. A consumer desires to use a gas-iron in a kitchen in which the illumination is carried out by means of a 1-light inverted pendant. Explain exactly how and where you would provide the connection for this. Illustrate your answer with a sketch. (40.)

FINAL.—WRITTEN PAPER.

(*Not more than six questions to be attempted.*)

1. Describe exactly how you would heat the office buildings shown on the loose sheet No. 1, given to you with this paper (fig. 1), by the employment of a gas-heated circulator, hot-water pipes, and radiators. The installation should be capable of maintaining the temperature of the offices at 60° Fahr. during winter months. Indicate on the plan the size and position of (*a*) circulator, (*b*) flow and return pipes, (*c*) radiators. What type of circulator would you use? What would be the consumption of gas per hour, and what size of gas-supply pipe would you run? (60.)
2. What are the chief points to be observed in fixing the following gas apparatus: (*a*) Geyser, (*b*) circulator, (*c*) wash boiler, (*d*) outside shop lamp? State the points in order of importance. (50.)
3. Describe any improvements that you have noticed during the past two years in (*a*) the design and efficiency of gas cooking stoves, (*b*) gas-fires, (*c*) lighting burners and glassware for domestic purposes, (*d*) gas-heated furnaces for heat treatment of metals. (40.)
4. Fig. 2 on the loose sheet No. 2, given to you with this paper, is a plan of a flat in which gas is to be installed for fires, cooking, and hot-water supply for bath and domestic use. You are to indicate on the plan (*a*) the runs and sizes of pipe required for the various appliances, (*b*) the size of service and meter that you would instal, (*c*) the size and type of gas-heated boiler that you recommend, stating the reasons for your choice, (*d*) the quantity of the various-size pipes and fittings required for the carcassing only, (*e*) the time required on the premises for carcassing only. (50.)
5. What are the causes of the following defects in the working of a gas-engine, and how would you remedy them: (*a*) Misfiring (tube ignition), (*b*) knocking, (*c*) smoky exhaust, (*d*) oscillation at meter, (*e*) difficulty in starting when cold, (*f*) blowing at front end of cylinder? (40.)
6. An institution requires gas for the following apparatus:

   350 inverted burners, full size.
   32 " " medium size.
   25 " " bijou size.
   1 treble-oven cooking range, with hotplate complete.
   6 eight double-loop gas-steam radiators, 39-in. high.
   6 eleven-radiant gas-fires.
   2 nine " " "
   7 lamps fitted with six medium burner clusters.

   State—
   (*a*) The hourly consumption of each class of apparatus.
   (*b*) The size of service and meter that you would fix, assuming that 80 p.ct. of the installation was required for use at the same time.
   (*c*) The cost of gas for 10 hours on the basis stated in (*b*) with gas at 9d. per therm. (C.V. of gas = 480 B.Th.U.) (60.)
7. Explain by means of a sketch how you would fit an inset fire of the "Sunbeam" or "Cinderella" type, in order to prevent sand and other particles falling from the chimney on to the fire. Name the chief points of difference between fires of the above type and those containing upright radiants. (40.)
8. You are sent to a house to investigate a complaint of defective supply, the consumer complaining of the poor quality of the gas, stating that with the exception of the lights in the dining-room the supply all over the house is poor, and that very poor cooking results are obtained. Explain precisely how you would proceed to deal with the complaint. To what causes may the trouble be attributed, and how would you remedy matters? (40.)
9. Describe any form of gas-heated water apparatus capable of giving an instantaneous supply of boiling water for tea or coffee making in a café. Explain exactly its construction and the precautions which must be taken in fixing, to ensure satisfactory and efficient working.

**Coal-Tar Distillation and Crude Intermediate Products.**

Examiner: Mr. W. H. Coleman.

FINAL—WRITTEN PAPER.

(*Not more than six questions to be attempted. The maximum number of marks obtainable is the same for each question.*)

1. Give some account of the use of vacuum in tar distilling, and discuss the advantages and disadvantages of this process.
2. Describe in detail, with sketches showing the apparatus and plant

you would employ, the process of washing crude benzole or light oil previous to fractionation. What precautions would you employ to avoid emulsification, and how would you deal with the emulsion if it were formed?

3. What processes have been proposed to refine crude benzole other than by sulphuric acid washing? Describe any process the details of which have been published, and discuss its advantages and disadvantages.

4. What are the special properties required in an oil for the Diesel type of internal-combustion engine? How would you treat ordinary coal-tar creosote to render it suitable for use in this type of engine?

5. What precautions would you take to avoid accidents when cleaning out a tar still? If a workman were gassed accidentally, what measures would you take to revive him?

6. Discuss the various ways of dealing with the noxious gases from sulphate of ammonia manufacture, and state, with reasons, the process that you consider to be the best.

7. Describe carefully any three of the following methods of testing: (*a*) Determination of free carbon in tar; (*b*) determining the suitability of pitch for briquette manufacture; (*c*) determining the value of a crude creosote as a source of carbolic acid; (*d*) valuing crude pyridine; (*e*) determining the suitability of naphthalene for the colour industry; (*f*) valuing crude gas liquor.

8. Give some account of work that has been published recently dealing with the question of fractional distillation and the design of fractionating columns.

FINAL—PRACTICAL TEST.

(*All the questions may be attempted if time allows, but full marks can be obtained from three satisfactory answers. The maximum number of marks obtainable is the same for each question.*)

1. Examine the sample of pitch marked A, and state from the results your opinion of its suitability for paving purposes.

2. B is a sample of creosote intended for wood preservation. Examine it and report on its suitability for this purpose.

3. C is a sample of washed crude benzole ready for fractionation. Do you consider that it has been properly washed?

4. What is sample D? Make the usual laboratory tests to decide upon its quality.

**Pinner Gas Capital Issue.**—Messrs. A. & W. Richards have been instructed by the Directors to offer for sale by tender £27,000 of capital in the Pinner Gas Company, Ltd., comprising 5400 £5 6 p.ct. irredeemable preference shares (or such number as will, with premiums, realize the net amount of £27,082 9s. 4d.). The minimum price of issue is par. The dividend is covered more than four times over, and the money is required for extensions of the works and plant necessitated by the constantly increasing demand for gas. Tenders must be sent in to Messrs. Richards, No. 37, Walbrook, E.C., not later than 11 o'clock on Tuesday, May 27.

## CURRENT SALES OF GAS PRODUCTS.

LONDON, *May* 12.

There is little demand for pitch for prompt shipment, and the price is quite normal. For next season's delivery there is more inquiry; prices suggested being in the neighbourhood of 65s. per ton. The demand for road tar is good, and large quantities are being sent out. Creosote is quiet at about 8¼d. per gallon net and naked. Pure toluole is about 1s. 10½d. per gallon; pure benzole and 95-160 solvent naphtha are about 1s. 9d. per gallon. Other products are without change.

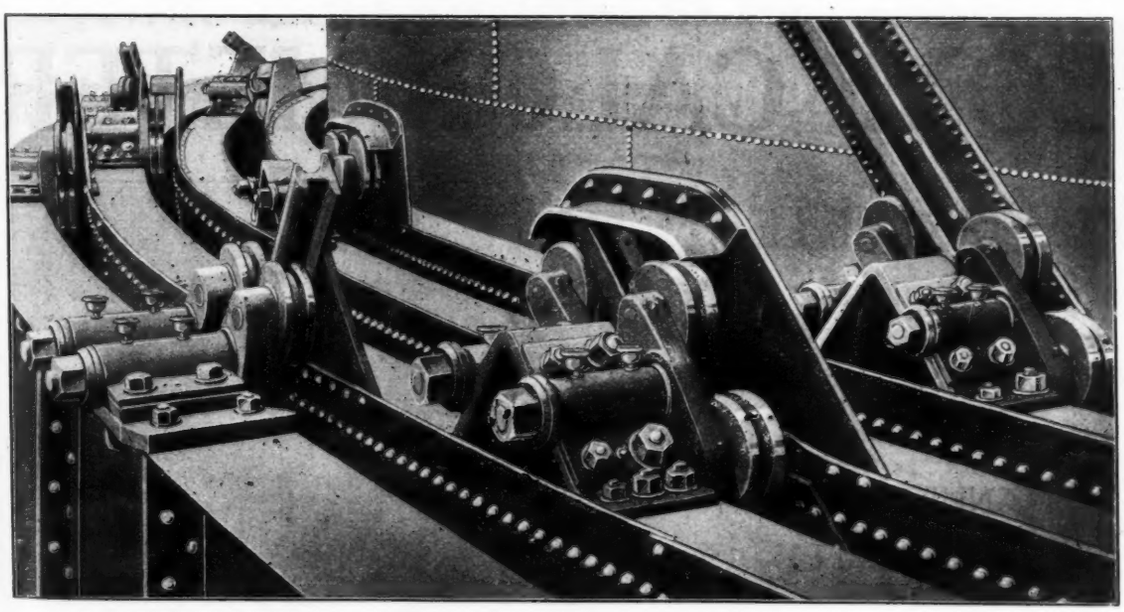
### Tar Products in the Provinces.

*May* 12.

The average values for gas-works products during last week were: Gas-works coal tar, 47s. 6d. to 52s. 6d. Pitch, East Coast, 55s. to 57s. 6d. f.o.b. West Coast—Manchester, 51s. 6d. to 52s. 6d; Liverpool, 52s. 6d. to 53s. 6d.; Clyde, 54s. to 55s. Benzole 90 p.ct., North, 1s. 5d. to 1s. 6d.; crude 65 p.ct. at 120° C., 1s. to 1s. 1d. naked at makers' works; 50-90 p.ct., naked, North, 1s. 8d. to 1s. 10d. Toluole, naked, North, 1s. 5d. to 1s. 6d., nominal. Coal tar crude naphtha in bulk, North, 7½d. to 8d. Solvent naphtha, naked, North, 1s. 4d. to 1s. 5d. Heavy naphtha, North, 1s. 2d. to 1s. 3d. Creosote, in bulk, North, liquid, 7½d. to 7¾d.; salty, 7d. to 7½d.; Scotland, 6¼d. to 7d. Heavy oils, in bulk, North, 9d. to 9¼d. Carbolic acid, 60 p.ct., 2s. 1½d. to 2s. 4½d. prompt. Naphthalene, £15 to £16; salts, £6 to £8, bags included. Anthracene, "A" quality, 4d. per minimum 40 p.ct., purely nominal; "B" unsaleable.

**Stoke-on-Trent Exhibition.**—At the Light, Heat, and Power Exhibition at Stoke-on-Trent (recently referred to in the "JOURNAL") in which important gas-stove makers took part, there was great competition as to who should obtain the Mayoress's order for a gas-cooker. Her final decision was to purchase a Davis No. 139 "Alpine"—a cooker characterized by a white tile-pattern enamelled exterior—and plate-rack.

**Gas Exhibition at Faversham.**—An interesting gas exhibition was opened on Monday last in the Lecture Hall of the Faversham Gas Company's showrooms. The display, which has been arranged by the Gas Company in co-operation with the Davis Gas-Stove Company, Ltd., and the Richmond Gas Stove and Meter Company, will continue until May 23. Popular cookery demonstrations will be given each afternoon and evening during the whole period of the exhibition, and these, together with other attractions, are creating considerable interest in the district. Gas cooking, heating, and water-heating appliances which may be obtained from the Faversham Gas Company on favourable hire-purchase terms, are shown fitted and in operation. A special display of the Davis "Alpine" and Richmond's "Bungalow" cookers enable visitors readily to appreciate the many advantages they possess.



THE NEW "BEARSCOT" TWIN GUIDE ROLLERS

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MANCHESTER.

## THE NORTH-EAST COAST COAL TRADE.

**From our Own Correspondent.**

The week opened under continued heavy depression, and the situation was in no way affected by the closing of the pits throughout the two counties for the miners' "May Day" celebrations, and the consequent loss of a day's output. A check to the downward tendency of prices came, however, with the news of the Ruhr lock-out. This did not actually bring in any great volume of new business; but in a good many cases buyers on the Continent, who had been tempted to forward inquiries by the low quotations ruling on this side, were induced to come in with orders, instead of repeatedly wiring back lower counter-offers, as they had been doing. The week closed with a much better undertone, though actual new business is still very scarce.

At the week-end comes the further news of the strong possibility of a strike of trimmers throughout the country. This, of course, would have the effect of paralyzing the coal trade here, since the vast bulk of it is shipment trade, which cannot proceed without the teemers and trimmers. It remains to be seen what the outcome will be; but with this threat, and the uncertainty as to wages negotiations with the Miners' Federation, the outlook points to a period of continued unsettlement which will make business difficult.

Gas coal is easily the firmest market, Wear Specials being in a comparatively strong position, and quoting 24s. to 24s. 6d. f.o.b. Best qualities (Holmside, Boldon class) quote 23s. 6d. to 24s.; prices at which prompt cargoes can be bought depending upon collieries' individual positions. Seconds are plentiful at 21s. to 22s.

## COAL TRADE IN THE MIDLANDS.

**From our Local Correspondent.**

The gas coal trade has gone very quiet indeed. Engineers are watching developments, and hope that an atmosphere more favourable to their negotiations will supervene before the question of the annual contracts is opened. Arrears of deliveries are being gradually reduced; but they will take some weeks to put right. The publication of the report on the Buckmaster inquiry has not done much to relieve the perplexities of the market. Another baffling factor has been introduced by the stand which is being made by the German miners against the eight-hour day. If this should result in a quickening of the Continental demand once again it would alter the outlook in the home market. Meanwhile, it is felt that the position is unstable, and consumers whose requirements are not fully covered are buying only in small quantities. The household trade has fallen extremely flat.

In the coke market, there has been a sudden reversal of the balance; supplies both of gas and furnace cokes being abundant. Prices of blast-furnace coke have collapsed. Producers are making deliveries against contracts on a scale exceeding the stocking accommodation of consumers. Supplies have been freely offered at 24s. at ovens. Durham coke can be bought at prices which make it worth the while of Midland blast-furnaces to pay the extra freight.

## YORKSHIRE AND LANCASHIRE COAL TRADE.

**From our Local Correspondent.**

Collieries are still working to their utmost capacity, although there is a feeling of uncertainty as to the future. Consumers generally, however, are not inclined to buy very far ahead. There has naturally been a decline in the demand for house coal, and industries, having for the most part laid in large stocks recently, are not now in the market. The gas-coal trade is quieter. There appears to be no inclination on the part of consumers to buy ahead, and it is problematical whether prices will be maintained at the figures obtaining over the last twelve months in respect of contracts as from July 1. The export market is weaker.

## TRADE NOTES.

**The "Slingsby-Jacklift."**

Messrs. H. C. Slingsby, of Nos. 89, 95, and 97, Kingsway, W.C.2, have forwarded some interesting information regarding their "Slingsby-Jacklift"—a remarkable labour-saving device for handling and elevating loads. By its use, a man can lift 8000 lbs. with ease.

**The "Thomas" Meter.**

From the Cambridge and Paul Instrument Company, Ltd., No. 45, Grosvenor Place, London, S.W. 1, we learn that there are now about 250 "Thomas" meters in continuous operation. This type of meter has made possible the measurement of gas directly in cubic feet; no corrections being necessary for changes in temperature or pressure.

**Pan-Ash Washing Plant for Shipley.**—At a recent meeting of the Shipley Gas Committee, it was decided to accept the tender of Messrs. Geo. Waller & Sons for the installation of a pan-ash washing plant, exclusive of motive power and foundations, at a price of £492.

**Gas for a Housing Scheme.**—The Housing Committee of the London County Council have accepted an offer of the South Metropolitan Gas Company to lay mains and services to houses on the Downham Estate and to fix the necessary piping and fittings for lighting and cooking, including stoves, on the prepayment meter system, free of cost to the Council, upon the condition that this offer will not exclude the use of electricity if afterwards desired on any part of the estate.

*GAS REGULATION ACT, 1920.*

# BOYS' CALORIMETER

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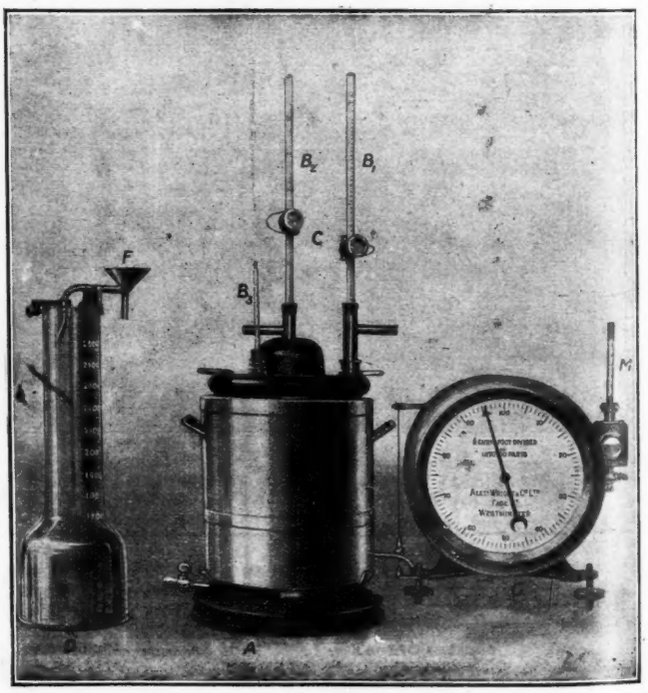

**Fairy Gas Competition.**—The Bradford Corporation Gas Committee, being informed that a thousand Bradford school children had qualified for the adjudication in the "Fairy Gas Competition" of the British Commercial Gas Association, which was in the hands of the Bradford City Gas Engineer (Mr. Charles Wood), the Committee authorized £10 to be expended in providing extra prizes of 10s. and 5s. each, for distribution among the children.

**Rotherham Gas Prices.**—An interesting report on gas prices has been submitted to the Rotherham Town Council by Alderman Bingham, the Chairman of the Gas Committee, who stated that the gas undertaking had a very successful year in 1923. The price of gas in the first two quarters, June and September, of 1922, was 4s. 3d. per 1000 c.ft., and in the December quarter of 1922 and the March quarter of 1923 3s. 9d. per 1000 c.ft. During the past financial year, the rate was 3s. 9d. for the June and September quarters, and 3s. 4d. for the last two quarters, so that the saving to the gas consumers this year, owing to these reductions, had been £6900. The revenue was £59,297, compared with £63,095 last year, and they had sold 16,343,000 c.ft. more gas.

**An Unsealed Tender.**—The Thornton Urban District Council were unsuccessful in a claim for £19 7s. 3d. against the British Roofing Company, at the Blackpool County Court, on May 7. Judgment was given in favour of the Company, with costs. The Council claimed that they had suffered damage because the Company had failed to carry out an agreement to supply and deliver certain materials at the Thornton Gas-Works. The Judge said a tender by the Company for £74 9s. had been accepted by the District Council in writing, but not sealed. The Council submitted that the contract was not within the section which required contracts exceeding £50 to be made under seal, but was made by them as a gas undertaking, and under the Thornton District Gas Act, 1906. The Judge was of opinon that, as there was no contract under seal at the time the proceedings were commenced, the fact that the seal was not affixed to the tender until the Company refused to carry it out was fatal to the Council's claim.

**Meter Testing at Middlesbrough.**—Mr. C. F. Blincoe (the Gas Engineer to the Middlesbrough Corporation) has reported to his Committee on the subject of a gas-meter testing station. He states that at present the station is jointly used by the Gas Department and the Meter Inspector. The gas-works men assist the latter in his duties, while the whole cost of providing and maintaining the station, as well as the Meter Inspector's salary, have been charged to the Gas Committee. On the same subject the Clerk to the Compensation Authority has written stating that the Justices recommend that the salary of Mr. Banks (the Inspector) should be increased from £100 to £150 a year, Mr. Banks to provide in future all his assistance, and to have sole charge of the existing test room until new premises are ready. The Gas Committee have ordered that the costs shall no longer be borne by them, but transferred to the borough fund, and that the Borough Accountant make the necessary adjustments in order to comply with section 7 of the Sales of Gas Act, 1859.

**A Deputation from Edinburgh.**—Tributes to the efficiency of the Blackburn Corporation Gas-Works were paid by a deputation from the Edinburgh City Council after they had inspected the Greenbank Works last week. The deputation were met at the station by Mr. E. Hamer, J.P. (Chairman of the Gas Committee), and welcomed at the Town Hall by the Mayor (Alderman J. T. T. Ramsay, J.P.). Accompanied by the Mayor, Mr. Hamer, other Aldermen and Councillors, and Mr. G. P. Mitchell (Borough Gas Engineer) they spent considerable time at the gas-works. The deputation also inspected the Great Harwood Works of the Accrington and District Gas Board. They were received by the Chairman of the Gas Committee (Alderman D. C. Dewhurst) and the Gas Manager (Mr. A. J. Harrison), who conducted them round the new plant. They complimented the Board on the efficiency of their works.

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The Leeds Corporation Gas Department are about to introduce slot meters which will automatically supply change for silver coins.

The Knaresborough District Council have agreed to reduce the price of gas by 4d. per 1000 c.ft., making the charge 4s. 7d. per 1000 c.ft.

The Dalton-in-Furness Gas Committee have decided to abolish rentals on the gas-cookers at present in use by consumers, and to issue new cookers on hire-purchase terms.

It was reported to the Barnoldswick Urban District Council that the annual statement of the gas-works showed a profit of £4850 for the year. This has been transferred to the reserve fund.

The Salford Gas Department intend to reduce the price of gas to all consumers by 4d. per 1000 c.ft. after the meter readings for the quarter ending June 30. There will be a corresponding reduction to consumers through prepayment meters.

An escape of gas resulted in a fire in the purifier house of the East Hull Gas-Works last week. Great bravery was shown by the men, who, regardless of the danger, stuck to their posts in a successful endeavour to prevent an explosion.

A fatality occurred at the Woodhouse Gas-Works late yesterday afternoon. William Wilson was working on a ladder when he slipped and fell, fracturing his skull. He was removed to the Royal Infirmary, Sheffield, where he died about an hour later.

William Monaghan, of Dundee, pleaded guilty at the Dundee Sheriff Court last week to breaking open a gas-meter at the house occupied by George Monaghan, No. 36, Hilltown, and stealing 6s. 4d. Sheriff Malcolm fined him 15s., with seven days to pay, or ten days' imprisonment.

The Middlesbrough Gas Committee have given instructions for collectors to take a census as to the number of inhabitants who would be desirous of having a gas-heated water boiler installed. This is in order that some idea may be obtained as to the quantity which would be used, and to enable them to consider the best method of dealing with the collection of charges for the use of these appliances.


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# STOCK MARKET REPORT.

Business continued to improve on the Stock Exchange last week, but principally in the better class investments. This was illustrated by the eager demand for the New Zealand 4½ p.ct. and the Swedish match issues. In both cases dealings are in progress, and are quoted at premiums of 1/16 and 6s. 6d. respectively.

There was a slight setback in French issues attributed to the weakness of the French franc, the future of which is the cause of considerable anxiety. In the absence of more drastic reforms in the financial policy of France, it cannot be expected that the franc will remain at its present value, 72·95. The result of the German elections and the rumoured friction between France and Turkey over the Syrian frontier may have had an adverse effect.

In the Industrial Market, Iron, Coal, and Steel shares continued to be neglected; but Tobaccos, Catering, and Brewery shares were in demand.

There was considerable activity in the Gas Market, and more transactions were recorded than usual. As will be noticed in the table, all the movements other than *ex*-div. quotations, were in an upward direction the highest being 4 points in the Aldershot 5 p.ct. maximum.

The following transactions were recorded during the week: On Monday, Alliance and Dublin, 66, 66⅜, 66¾, Bombay 5⅛, 5⅛, Bournemouth "B" 12⅛, 4 p.ct. debenture 80, Brentford "A" 98½, "B" 97, 98½, 98½, 4 p.ct. debenture 80, Commercial 4 p.ct. 92⅜, European 6⅞, Gas Light and Coke 92⅛, 92¼, 92⅜, 92½, 3½ p.ct. maximum 63, 4 p.ct. preference 80½, Imperial Continental 161½, Montevideo 56, 56½, Primitiva 8s., 5 p.ct. preference 32s., 33s. 6d., San Paulo 6 p.ct. preference 5 1/16, 6½, South Metropolitan 98½, 99¼, 100¼, 6½ p.ct. debenture 104⅞, Tottenham 4 p.ct. debenture 80, Wandsworth 3 p.ct. debenture 60. Supplementary prices, Eastbourne "B" 103, Tottenham 5 p.ct. preference 91½.

On Tuesday, Aldershot "C" 77, Alliance and Dublin 66, 4 p.ct. debenture 63⅜, Bombay 5 3/16, Brentford 6 p.ct. Richmond debenture 100, British 119, Commercial 4 p.ct. 92⅜, Continental Union 28½, 7 p.ct. preference 77, Croydon sliding-scale 103, Gas Light and Coke 92, 92⅛, 92¼, 92⅜, 92⅝, 92¾, 3½ p.ct. maximum 63 63⅜, 4 p.ct. preference 80½, 3 p.ct. debenture 60½, 61, Imperial Continental 161, 162½, Liverpool 7 p.ct. preference 105½, Oriental 102½, Primitiva 8s., 5 p.ct. preference 32s., 4 p.ct. debenture (1911) 55½, 55½, 56, South Metropolitan 98¾, 99, 99¼, 99⅝, 100½. Supplementary prices, Chester United 5 p.ct. maximum 89⅝, 89⅞, Colonial 15s. 9d., 16s., Danish 778. 6d., 78s. 9d.

On Wednesday, Alliance and Dublin 65½, 66½, 4 p.ct. debenture 62, 63¾, Bombay 5 1/16, Brentford "B" 98½, 6 p.ct. Richmond debenture 100½, 104½, British 118, Continental Union, 7 p.ct. preference 79, Gas Light and Coke 92½, 92¾, 3½ p.ct. maximum 62¾, 4 p.ct. preference 80½, 81½, Imperial Continental 161½, 162½, Lea Bridge District 97, 97½, Oriental 102, 102½, South Metropolitan 99, 99¼, 99½, 99⅝, South Suburban 5 p.ct. 99, Swansea 7 p.ct. preference 102½, Tottenham "B" 100, Supplementary prices, Brighton 6 p.ct. "B" preference 106½, Eastbourne 3½ p.ct. "B" 104, South Suburban 7 p.ct. debenture 100½.

On Thursday, Bournemouth "B" 12 5/16, Gas Light and Coke 93, 93¼, 93½, 3½ p.ct. maximum 62⅝, 4 p.ct. preference 81½, Hastings and St. Leonards 3½ p.ct. converted 78½, Imperial Continental 161, 162½, 3½ p.ct. debenture 70, Liverpool 7 p.ct. preference 105½, South Metropolitan 99, 99¼, South Suburban 5 p.ct. 101, Supplementary prices, Horley District 10 p.ct. "A" 100½, Leatherhead 5 p.ct. 9½, 10.

On Friday, Bombay £5 4s. 3d., Brentford "B" 98⅛, Cape Town and District 6⅜, 6½, European 6¾, 6⅞, Gas Light and Coke 93½, 93⅝, 93⅞, 94, 3½ p.ct. maximum 63¼, 4 p.ct. preference 80⅝, Imperial Continental 161, 161½, 162, 162½, 3½ p.ct. debenture 70, South Metropolitan 99, 99¼, 99½. Supplementary prices, Aldershot new "C" (5 p.ct. maximum) 8-½, 81.

The monetary situation remains easy. Treasury Bills were again at under 3 p.ct., the price being £2 18s. 6·18d. p.ct. This rate shows a fall since Feb. 8 of nearly 13s. p.ct., though on two occasions since the rate has been on slightly better terms. It is not expected that there will be any change in the Bank rate for some time. The rate for renewal of loans was generally 2 p.ct., though balances were available at down to ½ p.ct.

As we have already indicated, the value of the French franc depreciated materially during the week. Belgian francs fell away in sympathy about 7 points, and closed at 88⅝. Other exchanges, though disturbed, show little variation; the dollar-sterling being about 3 points lower on the week.

There were considerable dealings in silver during the week, and the price advanced to 33 11/16d. per oz., partly due to the movement in the New York exchange.

The Bank rate is 4 p.ct., to which it was raised from 3 p.ct. on July 5. Bankers' deposit rates are 2 p.ct. The deposit rates of the discount houses are 2 p.ct. at call and 2¼ p.ct. at notice.

| Issue. | Share. | When ex-Dividend. | Dividends. Prev. Hf.Yr. | Dividends. Last Hf. Yr. | NAME. | Quotations. May 9. | Rise + or Fall − on Week. | Transactions Lowest and Highest Prices. |
|---|---|---|---|---|---|---|---|---|
| £ | | | % p.a. | % p.a. | | | | |
| 131,978 | Stk. | Feb. 7 | 5 | 5 | Aldershot 5 p.c. max. C. | 77—82 | +4 | 77 .. |
| 235,492 | ,, | ,, | 4 | 6 | Do. 4 p.c. Pref. | 68—73 | .. | 65¼—66½ |
| 1,551,868 | ,, | Apr. 3 | 5½ | 6 | Alliance & Dublin Ord. | 64—69 | .. | 62—63⅜ |
| 374,000 | ,, | Jan. 10 | 4 | 4 | Do. 4 p.c. Deb. | 60—65 | .. | 5 1/16—5 3/16 |
| 280,000 | 5 | Oct. 18 | 8 | 8 | Bombay, Ltd. | 5—5⅛ | .. | .. .. |
| 100,000 | 10 | Mar. 6 | 8½ | 8½ | Bournemouth 5 p.c. | 12⅛—13½ | .. | 12½—12 5/16 |
| 383,110 | 10 | ,, | 7 | 7 | Do. B 7 p.c. | 11½—12⅝ | .. | .. .. |
| 115,000 | 10 | ,, | 6 | 6 | Do. Pref. 6 p.c. | 11—12 | .. | .. .. |
| 50,000 | Stk. | Dec. 28 | 3 | 3 | Do. 3 p.c. Deb. | 55—60 | .. | 80 .. |
| 162,025 | ,, | ,, | 4 | 4 | Do. 4 p.c. Deb. | 75—80 | .. | 98½ .. |
| 992,045 | ,, | Feb. 21 | 6 1/16 | 6 3/16 | Brentford A Con. | 96—101 | .. | 97—98⅛ |
| 990,500 | ,, | ,, | 6⅛ | 6⅛ | Do. B New | 96—101 | .. | .. .. |
| 76,000 | ,, | ,, | 5 | 5 | Do. 5 p.c. Pref. | 89—94 | .. | 80 .. |
| 306,690 | ,, | Dec. 13 | 4 | 4 | Do. 4 p.c. Deb. | 76—81 | .. | 100—104½ |
| 181,337 | ,, | ,, | — | — | Do. 6 p.c. Rich. Red. Deb. | 100—105 | +2½ | .. .. |
| 214,740 | ,, | Mar. 6 | 11½ | 11½ | Brighton & Hove Orig. | 170—175 | .. | .. .. |
| 244,200 | ,, | ,, | 8½ | 8½ | Do. A Ord. | 124—127 | .. | .. .. |
| 1,287,500 | ,, | Feb. 21 | 5 | 5 | Bristol 5 p.c. max. | 90—91a | .. | 118—119 |
| 855,000 | ,, | Mar. 20 | — | 7 | British Ord. | 117—122 | .. | .. .. |
| 100,000 | ,, | ,, | 7 | 7 | Do. 7 p.c. Pref. | 120—125 | .. | .. .. |
| 120,000 | ,, | Dec. 28 | 4 | 4 | Do. 4 p.c. Red. Deb. | 73—78 | .. | 6⅛—6 1/16 |
| 100,000 | 10 | ,, | 7 | 6 | Cape Town, Ltd. | 6½—7⅛ | .. | .. .. |
| 100,000 | 10 | Apr. 24 | 4½ | 4½ | Do. 4½ p.c. Pref. | 6—7* | .. | .. .. |
| 150,000 | Stk. | Dec. 28 | 4½ | 4½ | Do. 4½ p.c. Deb. | 73—78 | .. | .. .. |
| 626,860 | ,, | Feb. 21 | 6 | 6 | Cardiff Con. Ord. | 97—99 | .. | .. .. |
| 237,860 | ,, | Dec. 28 | 7½ | 7½ | Do. 7½ p.c. Red. Deb. | 105—110 | .. | .. .. |
| 157,150 | ,, | Mar. 6 | 5 | 6½ | Chester 5 p.c. Ord. | 88—93b | +3 | 89½—90 |
| 1,513,280 | ,, | ,, | 6 | 6 | Commercial 4 p.c. Cap. | 90—95 | .. | 92½ .. |
| 560,000 | ,, | ,, | 6 | 6 | Do. 3½ p.c. Cap. | 90—95 | .. | .. .. |
| 475,000 | ,, | Dec. 13 | 3 | — | Do. 3 p.c. Deb. | 57—60 | .. | .. .. |
| 800,000 | ,, | 14 Jan. 15 | — | 7 | Continental Union, Ltd. | 28—33 | .. | 28½ .. |
| 200,000 | ,, | Dec. 13 | 7 | 6½ | Do. 7 p.c. Pref. | 75—80 | .. | 77—79 |
| 660,000 | ,, | Mar. 6 | 6½ | 5 | Croydon sliding scale | 101—104 | .. | 103 .. |
| 284,975 | ,, | ,, | 5 | 4½ | Do. max. div. | 83—86 | .. | .. .. |
| 492,270 | ,, | Feb. 21 | 3 | 4 | Derby Con. | 108—110c | .. | .. .. |
| 55,000 | ,, | Jan. 12 | 4 | 5 | Do. Deb. | 74—76c | .. | .. .. |
| 209,000 | ,, | Apr. 3 | 5 | 2 | East Hull 5 p.c. max. | .. | .. | .. .. |
| 1,002,180 | 10 | Jan. 24 | 5 | 5½ | European, Ltd. | 6½—7½ | .. | 6½—6⅞ |
| 16,503,045 | Stk. | Feb. 7 | 5½ | 3½ | Gas Light & Coke 4 p.c. Ord. | 93—95 | +2 | 92—94 |
| 2,600,000 | ,, | ,, | 3½ | 4 | Do. 3½ p.c. max. | 60—63 | .. | 62⅜—63½ |
| 4,062,235 | ,, | ,, | 4 | 3 | Do. 4 p.c. Con. Pref. | 79—82 | +1 | 80½—81½ |
| 4,761,930 | ,, | Dec. 13 | 3 | 10 | Do. 3 p.c. Con. Deb. | 59—62 | +1 | 60½—61 |
| 130,000 | ,, | Dec. 11 | 10 | 7½ | Do. 10 p.c. Bonds | .. | .. | .. .. |
| 42,000 | ,, | — | 7½ | 6½ | Do. 7½ p.c. Ilford Deb. | .. | .. | .. .. |
| 82,500 | ,, | Mar. 20 | 6½ | 5½ | Hastings & St. L. 5 p.c. Conv. | 91—96 | .. | 78½ .. |
| 258,740 | ,, | ,, | 5½ | 10 | Do. 3½ p.c. Conv. | 76—81 | .. | .. .. |
| 70,000 | 10 | May 8 | 10 | 10 | Hongkong & China, Ltd. | 16—17* | .. | .. .. |
| 86,600 | Stk. | Mar. 6 | 9½ | 10 | Hornsey 7 p.c. | 143—148 | .. | 161—162½ |
| 1,976,000 | ,, | Nov. 15 | 17 | 5 | Imperial Continental Cap. | 160—165 | .. | 70 .. |
| 401,400 | ,, | Feb. 7 | 3½ | 3½ | Do. 3½ p.c. Red. Deb. | 69—72 | +3 | 97—97½ |
| 235,242 | ,, | Mar. 6 | 6½ | 6½ | Lea Bridge 5 p.c. Ord. | 95—100 | .. | 90½ .. |
| 2,127,340 | ,, | Feb. 21 | 5½ | 5½ | Liverpool 5 p.c. Ord. | 90½—91½b | .. | 105½ .. |
| 600,000 | ,, | Mar. 20 | 7 | 7 | Do. 7 p.c. Red. Pref. | 103—106b | .. | .. .. |
| 165,736 | ,, | Feb. 21 | 9 | 8 | Maidstone 5 p.c. Cap. | 124—129 | .. | .. .. |
| 63,480 | ,, | Dec. 28 | 3 | 3 | Do. 3 p.c. Deb. | 54—59 | .. | .. .. |
| 75,000 | 5 | Dec. 13 | 7 | 5 | Malta & Mediterranean | 3⅜—3⅝ | .. | .. .. |
| 50,000 | 100 | Apr. 1 | 4½ | 4½ | Met. of Melb'rne 4½ p.c. Deb. | .. | .. | 56—56½ |
| 541,920 | Stk. | Nov. 29 | 4 | 4 | Montevideo, Ltd. | 54—59 | +1 | 84½ .. |
| 1,875,892 | ,, | Mar. 6 | 5½ | 5½ | Newcastle & Gateshead Con. | 84—85d | .. | .. .. |
| 250,166 | ,, | ,, | 4 | 4 | Do. 4 p.c. Pref. | 73—75d | .. | .. .. |
| 529,705 | ,, | Dec. 28 | 3½ | 3½ | Do. 3½ p.c. Deb. | 71—73d | .. | .. .. |
| 15,000 | 10 | Mar. 6 | 11 | 11 | North Middlesex 10 p.c. | 16—17 | .. | .. .. |
| 75,940 | 10 | ,, | 7 7/16 | 7 7/16 | Do. 7 p.c. | 11⅛—11⅜ | .. | 102—102½ |
| 300,000 | Stk. | May 8 | 9 | 7 | Oriental, Ltd. | 98—101* | −1 | .. .. |
| 138,120 | ,, | Dec. 28 | 7½ | 7½ | Plym'th & Ston'house 5 p.c. | 107—112 | .. | .. .. |
| 60,000 | 50 | Mar. 6 | 13 | 13 | Portsea Island B | 102—105 | .. | .. .. |
| 100,000 | 50 | ,, | 12 | 12 | Do. C | 98—103 | .. | 8/- .. |
| 1,450,345 | 5 | 29 Oct. 14 | — | — | Primitiva Ord. | ⅛—¼ | .. | 32/-—32/6 |
| 2,499,800 | 5 | 30 Dec. 15 | — | — | Do. 5 p.c. Pref. | 1 1/16—1 1/16 | .. | .. .. |
| 341,400 | 100 | Dec. 3 | 4 | 4 | Do. 4 p.c. Red. Deb. | 70—75 | .. | 55½ 56 |
| 600,000 | Stk. | Jan. 24 | 4 | 4 | Do. 4 p.c. Red. Deb. 1911 | 54—57 | .. | .. .. |
| 220,335 | ,, | Dec. 28 | 4 | 4 | Do. B. Aires 4 p.c. Rd. Db. | 55—58 | .. | .. .. |
| 321,670 | 10 | ,, | 4 | 4 | Do. R'r P'te 4 p.c. Rd. Db. | 55—58 | .. | .. .. |
| 150,000 | 50 | Oct. 4 | 6 | 6 | San Paulo 6 p.c. Pref. | 6—6½ | +⅛ | 5 1/16—6½ |
| 125,000 | Stk. | Jan. 2 | 5 | 5 | Do. 5 p.c. Red. Deb. | .. | .. | .. .. |
| 270,000 | ,, | Mar. 20 | 5 | 5 | Sheffield A | 39—41 | .. | .. .. |
| 419,968 | ,, | ,, | 5 | 5 | Do. B | 101—103e | .. | .. .. |
| 1,047,000 | ,, | Oct. 18 | 9 | 6 | Do. C | 101—103e | .. | .. .. |
| 90,000 | 10 | Feb 21 | 5 | 5 | South African | 7—9 | .. | — — |
| 6,609,895 | Stk. | Jan. 10 | 5 | 5 | South Met. Ord. | 98—101 | +1 | 98½—100½ |
| 102,580 | ,, | ,, | 3 | 3 | Do. Red. Pref. | 98—100 | .. | .. .. |
| 1,895,445 | ,, | Mar. 6 | 6½ | 6½ | Do. 3 p.c. Deb. | 57—60 | .. | .. .. |
| 734,000 | ,, | Aug. 23 | 8½ | 8½ | Do. 6½ p.c. Red. Deb. | 103—105 | .. | 104½ .. |
| 91,500 | ,, | Feb. 21 | 6 | 6½ | South Shields Con. | 136—138d | .. | .. .. |
| 1,087,795 | ,, | Dec. 28 | 5 | 5 | South Suburban Ord. 5 p.c. | 98—101 | .. | 99—101 |
| 368,837 | ,, | May 8 | 6 | 5 | Do. 5 p.c. Deb. | 95—100 | .. | .. .. |
| 647,740 | ,, | Dec. 28 | 4 | 4 | South'mpt'n Ord. 5 p.c. max. | 84—87* | −2 | .. .. |
| 121,275 | ,, | Mar. 6 | 7 | 7 | Do. 4 p.c. Deb. | 74—79 | .. | .. .. |
| 250,000 | ,, | Dec. 28 | 6½ | 6½ | Swansea 7 p.c. Red. Pref. | 102—104 | .. | 102½ .. |
| 200,000 | ,, | Feb. 21 | 8 | 8 | Do. 6½ p.c. Red. Deb. | 102—104 | .. | .. .. |
| 120,000 | ,, | ,, | 6½ | 6½ | Tottenham District A 5 p.c. | 119—124 | .. | .. .. |
| 582,275 | ,, | Dec. 13 | 4 | 4 | Do. B 3½ p.c. | 98—103 | .. | 100 .. |
| 181,255 | ,, | Mar. 20 | 5 | 7/14/4 | Do. 4 p.c. Deb. | 77—81 | .. | 80 .. |
| 258,251 | ,, | ,, | 9 | 9½ | Tynemouth Con. and New Wandsworth, Wimbledon, and Epsom— | 84—86d | .. | .. .. |
| 30,000 | ,, | Mar. 6 | 7½ | 7⅞ | Wandsworth A 5 p.c. | 132—137 | .. | .. .. |
| 255,636 | ,, | ,, | 6 3/16 | 6/7/9 | Do. B 3½ p.c. | 110—115 | .. | .. .. |
| 108,075 | ,, | ,, | 6 3/16 | 6/7/9 | Do. C | 96—101 | .. | .. .. |
| 240,865 | ,, | ,, | 7 5/16 | 7½ | New Ordinary. | .. | .. | .. .. |
| 352,000 | ,, | ,, | 7 5/16 | 7½ | Wimbledon 5 p.ct. | 108—113 | .. | .. .. |
| 98,000 | ,, | Dec. 28 | 3 | 3 | Epsom 5 p.ct. | 112—117 | .. | .. 60 |
| 88,416 | ,, | | | | 3 p.c. Deb. | 56—61 | .. | .. .. |

Quotations at:—*a.*—Bristol. *b.*—Liverpool. *c.*—Nottingham. *d.*—Newcastle. *e.*—Sheffield. * Ex. div.